

# The Mining And Metallurgical Journal

VOL. XVIII. NO. 10

LOS ANGELES, CAL.,

February 15, 1898,

SAN FRANCISCO, CAL.

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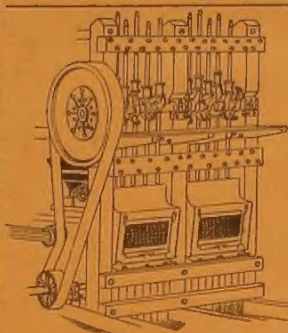
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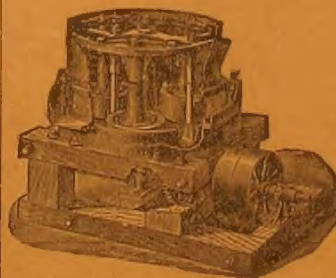
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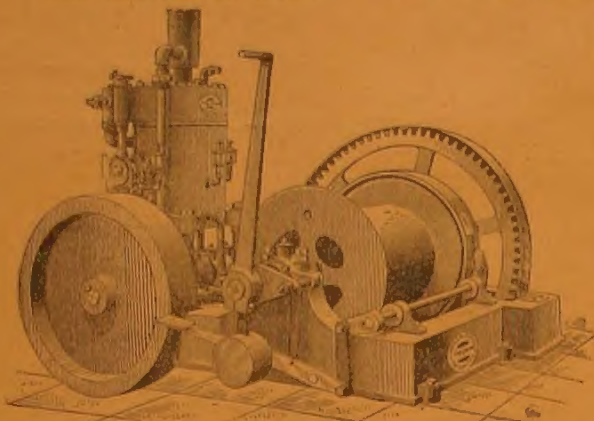
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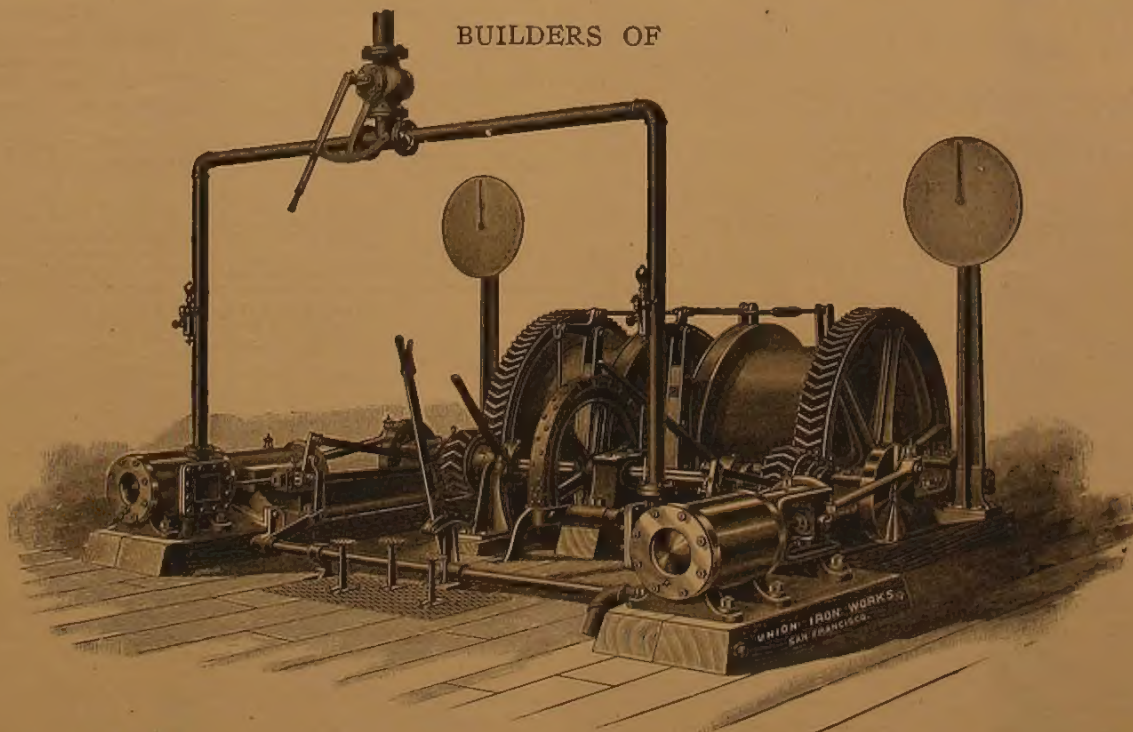
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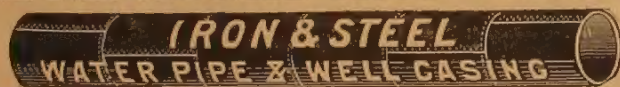
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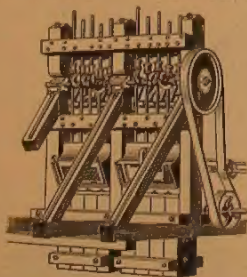
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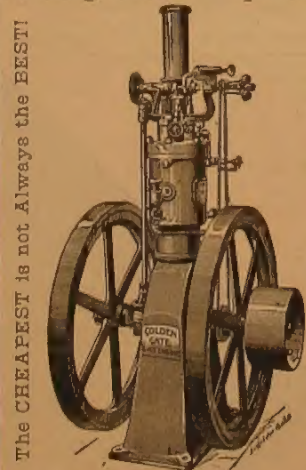
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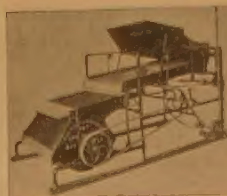
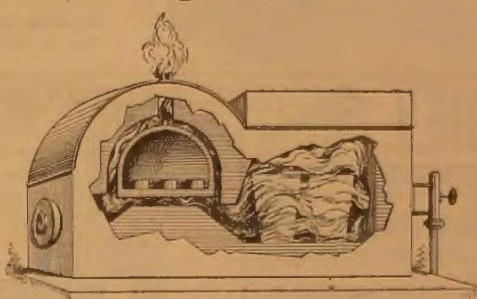
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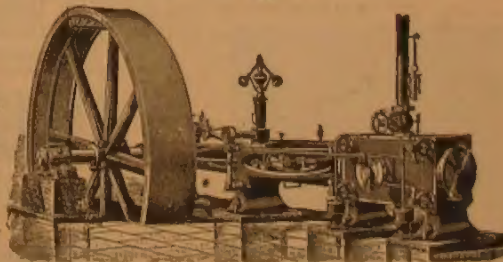
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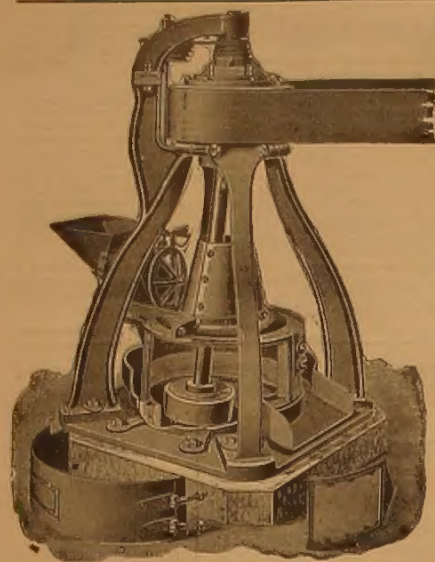
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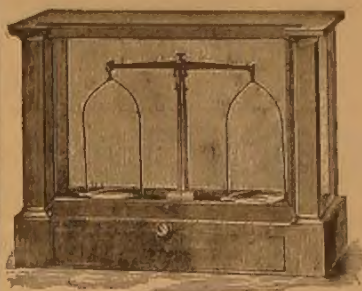
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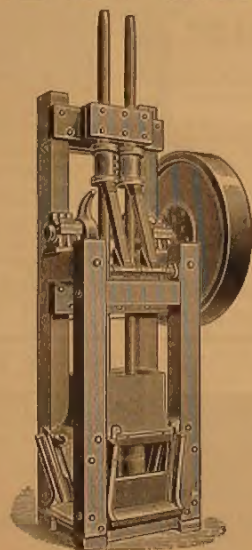
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*A Bill to Create an Executive Department of  
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Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that there shall be at the seat of government an executive department to be known as the "Department of Mines and Mining," the general designs and duties of which shall be to acquire, by examination, practical and scientific experiments, geological research, or otherwise, useful information on subjects connected with mining in the general and comprehensive sense of the word, and to diffuse same among the people of the United States.

SEC. 2. That said department shall be under the supervision of a Secretary of Mines and Mining, who shall be appointed by the President, by and with the consent of the Senate; and section one hundred and fifty-eight of the Revised Statutes is hereby amended to include such department, and the provisions of title four of said Revised Statutes including all amendments thereto, are hereby made applicable to said department.

Sec. 3. That there shall be in said department an Assistant Secretary of Mines and Mining, to be appointed by the President, by and with the advice and consent of the Senate, who shall perform such duties as may be required by law or prescribed by the Secretary thereof.

SEC. 4. That the Secretary of Mines and Mining shall receive the same salary as is paid to the Secretary of each of the executive departments, and the salary of the Assistant Secretary of Mines and Mining shall be the same as that now paid to the First Assistant Secretary of the Department of the Interior.

SEC. 5. That the duties now imposed by all laws and parts of laws relating to mines and mining affairs exclusively upon any existing department of the Government, or any division or bureau thereof, shall, on and after the day this act takes effect, be performed by the Department of Mines and Mining.

SEC. 6. That the Geological Survey is hereby transferred to the Department of Mines and Mining.

SEC. 7. That the sale of the mineral lands of the United States shall be conducted under the auspices of the Department of Mines and Mining.

SEC. 8. That on the organization of this department all officers and employees wholly engaged in official work in any department of the Government, or any division or bureau thereof, engaged in the performance of the duties referred to in section five of this act, and all such employed in the departments referred to in section five of this act, and all such employed in the departments referred to in sections six and seven hereof, shall be transferred to the Department of Mines and Mining.

Sec. 9. That all records, maps, documents, instruments, surveys, machinery and other materials now in the possession and use of any existing department of the Government, or any division or bureau thereof referred to in sections five, six and seven of this act, are transferred to the Department of Mines and Mining.

SEC. 10. That this act shall go into effect on the fourth day of March, eighteen hundred and ninety-nine.

The oft repeated demands of the mining section of the community for recognition in the Cabinet Councils of the country by being represented by a Secretary of Mines has taken shape at last. The magnitude and importance of the industry require such a step. With an ever increasing mineral output of \$162,061,106 for 1897, produced in all states and territories of the Union, we must expect still larger returns in the future. The history of other Cabinet appointments has likewise been a matter of necessity. The management of the heritage of the miner has too long been left in the hands of the officials of the land office without a chief who was responsible to the people, at the head of the Department. The custom in other countries, with much smaller and less productive mineral resources than that of the United States, may well be copied in protecting the interests of the miner and the welfare of the industry, which produces so much National wealth and strength.

THE ORIGIN OF THE ELEMENTS.

"Lord Kaelvin showed in a recent address that all the oxygen in the atmosphere probably came from the action of sunlight on plants. When the earth was a globe of hot liquid it contained no vegetable fuel, and probably no free oxygen. But as it cooled off plants appeared on its surface, and these began to evolve oxygen through the medium of the sunbeams. Upon the oxygen thus derived we depend for the maintenance of life by breathing. When we burn coal, or other vegetable fuel, we use up oxygen, and it is to plants again that we owe the restoration of the oxygen thus lost to the air. If they failed to keep up a sufficient supply, the atmosphere would gradually part with its oxygen and the inhabitants of the earth would gradually disappear in consequence of asphyxiation."

To establish a theory of the origin of the elements or of the atmosphere direct testi-

mony is necessary. The lowest form of animal or plant life is protoplasm which contains oxygen, and in the evolution of all life from protoplasm as a first cause, through millions of years, until the latter part of the Devonian or early part of the Carboniferous period of geological time, when true plants first appeared on the earth, the slow and very limited production of oxygen by plants must have been taking place. To form the first elementary protoplasm an ocean of water was required and to form that water (which now covers three quarters of the surface of the earth) great condensation of gasses must have taken place on the surface of a rapidly cooling world. The matter must have got its oxygen from the atmosphere, and the protoplasm got it from the water, for without an atmosphere there would be no water and plant or animal life could not exist. As oxygen forms about half, by weight, of all the rocks of the earth, and enters largely into the composition of many of the largest ore bodies, such as iron, it must have existed from all time contemporaneous with the other elements.

A writer on the origin of the mineral apatite or phosphate of lime, suggested the absurd theory that as phosphate of lime was a constituent of certain lingule and of the bones of fishes, that the mineral apatite was of animal origin. As the Laurentian or Archæan rocks in which it is found are pre-palæozoic the contention is absurd. Plants and animals have the power of assimilating elementary substances already existing in another form, but have not the power of creating or increasing them. It would be equally erroneous to contend that because iron is a constituent of the human race and as the human frame contains phosphates, that the iron ore bodies of the world, which are the largest of their kind at present known among all the ores, that as they contain iron and phosphates they are probably of human origin, from an extinct race of men of metal who, fortunately for us, had their sand taken out so as to leave the iron workable!

The origin of the atmosphere, the elements and of life are still a step beyond the grasp of the human mind.

THE BOND AGE.

For more than a quarter of a century, this country has been afflicted with a mania for issuing public bonds for a variety of purposes; governments of all kinds have engaged liberally in the business. In general, there has been no provision made to pay more than the interest, reliance being placed on refunding, and holders of such bonds have been liberal in extending time of payment through the issuance of new bonds. In some of the states sinking funds are provided which in time extinguish indebtedness.

In new countries where population is small and taxable property limited, indebtedness contracted for creation of public conveniences is doubtless wise, and also to promote certain *very* necessary improvements. But expenditures have not stopped here; they have often gone on extravagantly and foolishly, and the people have been burdened with indebtedness that has been like a millstone tied to their necks. An Irishman said the easiest way he knew of to pay a debt was to give a note for it. When some one has wanted an improvement, he suggested that the money could be had by selling bonds. It is an easy way to get the money, easier than it is by way of levying a tax, and, consequently, the bond-



issuing business leads to extravagance, fraud and corruption. Raising the money by taxation tends to the introduction and enforcement of economy.

Another objection to the bond business is that it induces capitalists to withhold their money from productive enterprises to be invested in public bonds. Were proper steps taken to reduce public indebtedness, money would be released and invested in industries, which would give larger employment, and add to the wealth of the country.

Nearly every age has had a designation illustrative of a prominent characteristic. There have been the golden age, the bronze age, the iron age, and the present may properly be called, so far as this country is concerned, the bond age. It is to be hoped that we are about to enter on a new one, to be called pay-as-you-go age.

### THE ALASKA BOOM.

Scripps-McRae Press Service reports that "E. Hazard Wells, the correspondent of the Scripps-McRae League is on his way to Washington as the special courier of Capt. P. H. Ray, commanding the United States forces along the Yukon. At the request of the War Department, he has been intercepted and the War Department has received dispatches from Quarter-master Robinson at Seattle, giving the substance of the report of Capt. P. H. Ray, forwarded from Fort Yukon.

Capt. Ray urges the Department to effectually check the immigration to the interior of Alaska of all persons not equipped with two years' supply of food. He declares there is no way for them to earn a living and that there have been no discoveries for eight months.

He estimates that only seven per cent. of the people who entered the country last year earned a living. He also recommends that steamers patrol rivers to protect the people against lawlessness."

This official and true report of the burst of the boom, which originated in the interests of the transportation companies and outfitting supply firms, operating in Alaska and on the Canadian Yukon, together with the honest warning of the Department of the Interior at Ottawa, is printed for the benefit of those who anticipate taking the great risk of a journey to the most difficult, inhospitable and worst country in the world to prospect or mine in.

If the same amount of capital and energy, as is required to reach and prospect in Alaska was intelligently employed in prospecting the mountains of the Southwest States, more permanent and better results would be obtained with less discomfort and risk to life and health.

New and very rich placer grounds will have to be discovered in the Northwest Territories, as those on El Dorado, Bonanza and Hunker Creeks are all located. On this account the fever-heated and excited brain of the inexperienced will have plenty of opportunity to get cooled, panning for new rich ground in the glacier, ice-cold water of Alaskan streams to the musical accompaniment of an interminable band of black flies and mosquitos.

### VALUE OF WATER POWER.

The neglect of the people or State Legislatures in allowing the water power sites of the country to pass into private or corporate own-

ership during recent years, is an error which it is necessary to correct and prevent in future. The necessity for such a step to be taken, in placing the water power sites on our mountain streams under State ownership or control, has been occasioned by the advances made in electrical science in recent years. The invention and rapid introduction and use of the system of electric heating and cooking for domestic purposes by the Ahren electric heaters some five years ago, together with the more general and widely extended application of electricity for lighting, power and general mining uses, have all tended to transform a water power into a source of heat and comfort, which was only afforded by the use of a product of a coal mine.

In states such as the west and southwest, where coal is high-priced, is the necessity for such legislative action more apparent, than in other localities where coal is cheap and water powers do not exist. The increased value of water power from these causes in recent years makes it necessary that this source of industrial power and heat should be made of benefit to the people at large, in placing the water powers of the State under the ownership and control of the State authorities, and not in the hands of private corporations, who are at present seeking to locate and control all the water power sites in the country. The water powers have become of such industrial importance on account of the possibilities in long distance transmission lines, that they ought to be reserved as a State property, and leased to corporations or companies on low terms for a period of years. The water, after being used for power purposes, can be used for mining or irrigation. If the water supply of the southwest was placed under the State or County control and ownership, as it ought to be in districts where irrigation is necessary. Our federal census reports on water powers can be of use to our State Legislatures in this matter, as they contain much valuable information and statistics on a subject which can be made to produce revenue in our mountainous States.

### DIVERSITY OF PRODUCTIONS.

A wise people will not only diversify productions, but they will endeavor to discover in what particular lines production is deficient, especially so far as local consumption is concerned. In some things, Southern California produces surpluses, and must therefore depend upon distant markets, to which transportation charges are so high as to detract from profits.

At certain seasons of the year there is deficient production of some vegetables, and especially of dairy products, eggs and poultry. Southern California, on account of climate and scenery, is particularly attractive to tourists and sojourners, and it has been made more so by reason of accommodations that have been created in cities, and at seaside and mountain resorts. Mining is rapidly increasing in this section, and special effort should be made to supply the mining camps with the staple articles of food of Southern California production. There is little profit on what is brought into the country, while that which is produced at home is all profit. These is plenty of land that can be devoted to raising all that is necessary in the way of substantial to supply tourists, sojourners and the mining camps. We commend this subject to the consideration of our agriculturists and horticulturists.

### MINING AND PROSPERITY.

Wealth is the product of nature and the labor of man, and hence the rapidity with which it is produced depends upon the bounties of nature and human industry and skill. It will always be true that agriculture will be the largest factor in wealth production, but it will not be flourishing unless other industries are developed and become prosperous.

Next to agriculture, mining is the most productive of wealth. Commerce may change the possession of wealth from one man or people to another, but it does not produce wealth. It is necessary, however, as an adjunct to productive industries, or it is a "handmaid to industries." Agriculture and mining supply the raw materials for manufacturers and commerce distributes the fabrics. All these things are interdependent; mining cannot flourish unless agriculture flourishes, and the prosperity of the latter is enhanced by the prosperity of the former.

The mining interests of the United States are of wider range than of any other country, and they contribute, consequently, more largely to commerce and the manufacturing industries and to general wealth, our mineral resources are so great and varied that the time is at hand when other nations will have to depend more than hitherto upon this country to supply their wants. Encouragement to mining in all its branches is as essential as encouragement to agriculture and the fabricating industries or commerce.

### THE STATUS NOT CHANGED.

The Senate passed the Teller resolution by a considerable majority, which declared the law to be that the bonds of the United States are payable in gold or silver coins, at the option of the government, and that payment of them in silver dollars would not be an act of bad faith towards the public creditors. The House of Representatives defeated it by substantially a party vote. The principle of the resolution was declared by both branches of Congress twenty years ago, by decisive majorities, and as the bonds are expressly payable in coin, the legal status of the question has not been changed by the recent action of Congress.

The issue between the double and single standard, however, is sharply made, and upon it political parties will hereafter fight their battle so far as concerns the money question. The Democrats, Populists and Silver Republicans are united in favor of the double, and the Republican party, by the action of the House of Representatives, the President and Secretary of the Treasury, and also by that of the body of the Republican Senators is committed to the single standard. It is properly to be inferred from the action of the House that if there were a bill pending to make the bonds payable in gold coin, it would pass it, as the Republicans are largely in the majority.

The country may expect continued educational efforts and eloquence upon the metallic feature of the financial question, and that there will be no rest until one side or the other feels compelled to run up the white flag, or as the lawyers would say, pleads *nolo contendere*.



## WISCONSIN.

WEST SUPERIOR, WIS., Feb. 3d, 1898.

The coming spring promises to see some substantial activity in the Western Ontario gold country. During the year past exploring has been carried on assiduously and several locations have been developed to the stage of actual mining. The prejudice against the country among mining men because of its location has been removed largely.

Superior and Duluth are the center of the American operation in this new territory, and in these cities is found an increased faith in the possibilities of the new gold fields. Local capital is largely interested and local men are active in prospecting and developing.

The new gold country includes the region around the Lake of the Woods, Rainy Lake, Seine River, Wabigoon and the district around Port Arthur on Lake Superior, all in Ontario, Canada. It extends across the

often plainly exposed on the surface. The rocks are highly disturbed and much metamorphosed. Some geologists advance the theory that the Laurentian, so called, are eruptive rocks of a later age, in fact, than the Huronian, but this theory does not seem sound. Certain it is that the formation is yet unknown geologically.

The ore occurs in veins both fissure and "bedded" and "fahrbands" or mineralized lenses in the country rock along probable zones of fracture and crushing. The best ore occurs along the contact of the Huronian and Laurentian and in granite dikes, or bosses or "reefs" they are locally called. With the gold, which except in one instance is free, is associated galena, zinc, sulphide, chalcopryrite and pyrite.

The active operations can be best estimated by the following summary of stamps, taken from the *Lake Superior Miner and Telegram*:

"Western Ontario now has stamps and stamp mills as follows:

## RAINY LAKE CITY GROUP.

Lyle Mining Company.....	10
Little American Mining Co.....	5

## JACKFISH BAY DISTRICT.

Empress.....	10
Test mills aggregating ten stamps.....	10

Total.....240

Of the number, the Huronian, Lake Harold, Empress, Triumph, Gold Hill, Ferguson, Lucky Coon and the 5-stamp mill at Rainy Lake City are not in operation. Several others have been dropping only a part of the time the past season, but for 1898 they will be steadily at work, together with several which have been wholly idle for various causes."

In this country there are no placer deposits, the glacial action having carried the debris to distant sections or buried it beneath barren till. The conditions for prospecting are very favorable, owing to the cheapness of supplies, the assessibility and the absence of surface de-



View of Alice A. Mine in Summer of 1897, Seine River District, Western Ontario, taken by M. C. French, Evening Telegram Staff Correspondent.

boundary into the United States. As yet, however, most of the operations are on the Canadian side. I do not mean that this whole country, as large as several ordinary states, is a gold belt, but actual developments have proven that a very large territory, only part of which is even explored, contains highly mineralized veins bearing free gold mostly in values from \$4 to \$40 a ton.

While the search for gold in this new field covers several years, the active prosecution of exploration and development is covered by the year 1897.

The geology of the country is interesting and complicated.\* The rocks are Archæan, being older than most gold-bearing rocks. The Laurentian and Huronian rocks which cover this section have been planed and ground down by glacial action and present a scantily covered, comparatively level country with the veins and internal structure of the formation

## LAKE OF THE WOODS DISTRICT.

No. of Stamps.

Sultana.....	10
Mikado.....	20
Keewatin Reduction Works.....	20
Rat Portage Reduction Works.....	20
Regina.....	20
Triumph.....	10
Gold Hill.....	10

## LOWER SEINE RIVER DISTRICT.

Foley's mine.....	20
Olive.....	7
Independence mine.....	5
Ferguson.....	3
Lucky Coon.....	5

## SAWBILL, LAKE AND SHEBANDOWAN DISTRICTS

Hammond Gold Reef.....	10
Sawbill.....	10
Huronian mine.....	10
Lake Harold.....	5

bris and the ample supply of fuel and water at all points. Most of the prospecting so far has been from canoes along the innumerable water routes which make the region a Venice on a large scale.

Experienced mining men and recognized mining authorities are giving attention to Western Ontario, and I confidently look for it to be recognized as a permanent and legitimate mining section from this on.

KIRBY THOMAS.

The Colorado Iron Works Company have just shipped two carloads of machinery for the new roasters the Germania Lead Works of Salt Lake City, Utah, are now putting in. This shipment will be followed with eight carloads more before the entire amount ordered, is shipped. The Bruckner Cylinders now being built by The Colorado Iron Works Co., for the above Company are 8 feet 6 inches diameter, by 27 feet long, and these will be shipped as soon as completed. The number of cylinders being built are five.

\*See our issue of Jan. 15th, 1898, on the geology of the country.



## CORRESPONDENCE

## COLORADO.

ELDORA, COL., FEB. 2d, 1898.

EDITOR JOURNAL—The Eldora-Enterprise Gold Mining Company was incorporated last week by Colorado Springs parties, including W. S. Stratton, of the Independence mine, and Jas. Burns, president of the Portland, for 1,000,000 shares, \$1.00 per share, to purchase the Enterprise property on Spencer Mountain. \$50,000 cash and \$50,000 in stock was paid for this promising property. The shaft is 95 feet deep and the vein is 62 inches wide at the bottom. The ore is a rich tellurium showing bars of bright sylvanite all through it. The many practical experts from Cripple Creek, who have examined the mine lately, state that it has a finer showing at the present depth than any in the Cripple Creek district.

tite and sylvanite. It has shipped some of the richest sulphides and sylvanite ore ever found in the state during the past year.

J. A. GILFILLAN, M. E.

## Miscellaneous Mining News.

## ARIZONA.

The *Mohave County Miner* (Kingman, Ariz.,) says: Clack Bros. and Poland are building up a nice little fortune from their Oro Plata lease. During the month of January and December they took out enough ore to net them fully \$12,000. They pay a royalty of fifteen per cent. and their expenses are far greater than those of the other lessees, as they have to keep the water from the mine and hoist their own waste. The ore which they are now taking from the stopes and

## ALASKA.

President Hill of the Great Northern believes a railroad to the Tanana river country in Alaska, from the mouth of the Copper river via Lake Luslota is practicable. F. B. Weare of the North American Transportation company says his company will try to send a steamboat up Tanana river next summer.

## CALIFORNIA.

AMADOR COUNTY.

Stevenson & Harmon, in the prospect on which they have been at work for some months, have uncovered a ledge of \$30 ore, the extent of which, however, they do not at the present time know. They are pushing it along, however, and expect a crushing and a clean-up soon.



Sultana Mine, Stamp Mill and Chlorination Works, Lake of the Woods District near Rat Portage.

The Village Belle mine on Spencer Mountain was purchased for Mr. Neil McDonald, of New York, for \$40,000 cash. The deal was made through the Mayham Investment Co., of Denver. The vein was 3½ feet wide at the bottom of the 105 foot shaft, 18 inches of which is exceedingly rich sylvanite ore.

W. S. Stratton and Jas. Burns have organized the El Paso-Eldora Gold Mining Co. and have purchased 80 acres of rich, patented, mineral land located south of Spencer Mountain on the line of Gilpin and Boulder County. They have also organized a company to install an electric power plant.

At the present time Eldora is the most talked of district in the State of Colorado, and is called the second Cripple Creek. It is located in the southwest corner of Boulder Co., on the great sulphide belt, running north from Idaho Springs through Central, Pine Creek and Ward into Wyoming. The ores are the sulphides of iron and copper, hema-

drifts run from fifteen to twenty-four ounces gold and over two hundred ounces silver to the ton. A few days ago they hoisted to the surface a slab of ore weighing over 500 lbs., worth \$150. The chunk is a mass of native silver and is worth nearly \$500 per ton in gold. The gentlemen will commence sinking another lift of fifty feet as soon as the railroad is open through the Fairview tunnel and coal can be had from Gallup.

A deed from B. F. Wood, et al., to Louis Rouchleau for an undivided three-eighths interest in the Crook mine, in the Hassayampa mining district, was filed for record at Prescott the other day. Consideration, \$7,500.

Hilda M. Anderson of Congress, has deeded her right, title and interest in mining claims in the Black Rock district to Chas. Born, Jr. and Chas. Born of Prescott; consideration, \$2,500.

Peter Reichling, superintendent of the Anita mine, paid over in behalf of the company the final payment of \$10,000 last evening to the owners of the property at the law office of Judge John F. Davis, the attorney for the company. It is understood that the company will push the work of exploration with great vigor, now that the drain of large payments for the purchase price is out of the way—*Ledger*.

CALAVERAS COUNTY.

The "San Antone," better known as the "Machu" mine, was bonded this week for a good round sum. The mine is one that is pretty well known owing to the width of the pay shoot. It was worked some years ago, yielding good results.

KERN COUNTY.

The old mines of Kern county, abandoned years ago by the Mexicans in the Caliente and Walker's basin sections, are receiving





Stamp Mill of Lucky Coon Mine in 1865. First Mill built in the Seine River District, Western Ontario.

much attention at present. The Three Chimnies mine, nine miles from Havilah, in the latter district, has been sold to an English syndicate. A recent run of three tons gave a return of \$1030 in gold, not including the value of the concentrates. Another four-ton lot gave \$650.

Randsburg, though there has been so much said against it is still a good camp, and has a number of first class properties, among the most important is the Rand mine. This property is working 100 men, developing and extracting ore. For the month of January, the production of gold was between \$40,000 and \$50,000.

The Butte mine in this camp is also a good property, but is liable to be tied up in litigation, as there is some trouble between Mr. Wilson and the original owners.

The bond which Mr. Wilson has on the property for \$40,000, it is reported, is more than the mine is worth at the present time.

Mr. Wilson has made two payments already upon the bond, which amounts to more than the mine could have been bought for at the time the bond was executed. A rich body of ore was recently struck in the shaft. Notwithstanding this fact, Mr. Wilson has not made the third payment upon the property.

There has been considerable talk of the Wedge mine having "pettered out," but the new strike recently recorded, does not corroborate this statement. Six thousand dollars was secured from a small amount of ore, milled at the new mill, from the 500-foot level of the mine.

The Little Butte is also a good property. The ore, though it is of a refractory character, going \$100 per ton, will free mill \$30 to \$40 per ton. This mine has lately erected the finest hoist in the Randsburg mining district. The mine was originally secured for \$8,000 from the locators.

On the whole, the Randsburg mining district has proven that it is best district in this southern country.

#### RIVERSIDE COUNTY.

C. E. Hambeer is developing the Noel copper mine at Palmdale, and is arranging to ship several carloads to San Francisco for testing purposes. The surface ore of this mine averages \$50 per ton in copper, gold and silver.

D. W. McDonald has acquired interests in Saugus mines and will put up a five-stamp mill at once. The proposition is free milling and runs \$150 in gold to the ton.

The Iron Chief, located in the Eagle Mountains, is under bond to Robt. Strauss and Mr. Shinn, who are developing the mine and working it full blast. They are also developing water to pipe to the mine. Their chances for getting a good supply are excellent.

Luce & Co. of the Eagles are working their mine and developing.

The Cactus people, also in the Eagle Mountains, have started an outfit for the mine to proceed with the development. There is a shaft already down 100 feet on the property and the ore shows up well.

#### SAN DIEGO COUNTY.

Great strikes are being made in the Chuckawalla district which is thirty miles northeast of Salton and 150 miles from Los Angeles. The Sterling Mining Company including Milton Santee, R. H. Howell, Judge Wellburn, Ben Goodrich and Ben Fredericks, has a splendid property with a large amount of development work done on it. Its ores assay as high as \$130, and a few large bodies go up from \$10 to \$25 free gold. The Granite mine is down 200 feet, with crosscuts, having 15 feet breast of ore, which goes \$20 and over. The Chuckawalla Company, with H. C. Christenden at its head, is doing considerable work. Landran & Gouch, and A. McMannon are testing their ores and sinking. Keller & Davis, who own the Buckeye, American and Surprise, are opening fine bodies of ore. Coffee & Mears, who own the Emma, are doing good work on a free gold ledge. King & Lattin, near Corn Springs, are operating in the April Fool Group. The Adams Bros. have five claims, which are being developed. M. R. Ritchie has four excellent claims, and has also developed an abundance of water. P. J. King, who owns the Gold King, shipped ore that netted him \$2000, and has also developed water. These parties are all from Los Angeles. In the entire district there are upward of 150 claims located, prospectors going in daily.

#### COLORADO

(From Mining Investor.)

##### Georgetown.

Kavanaugh & Nash in the 400-foot level have one foot of solid copper. They are directly over Nelson & Doane in the 500-foot level, who made the big strike a short time ago, and both partners are working the same streak of ore and making big wages.

Litigation between the Dunderberg and Frostberg seems to be endless. The case has



Typical Prospectors Camp in the Seine District, Western Ontario, not far from the Foley Mine.



## MICHIGAN.



Teaming in the Saw Bill District, Western Ontario, in the early development of the now well known Saw Bill Mine

been postponed to the next term of court, but a new complication has arisen. On application of R. O. Old, the officers of the New Dunderberg have been cited to appear before Judge Hallett Monday, January 25, to show cause why its members should not be fined for contempt. It is claimed that an injunction, issued by Judge Hallett, restraining the mining of ore within the limits of the Frostberg was violated.

#### Empire.

The two essential factors of a prosperous mining camp, paying mines and mills adapted to the treatment of their product, are being happily united at Empire through the influx of capital attested after careful examination of the region. A recent visit of Mrs. Atwood, manager of the Little Pittsburg company at Idaho Springs, resulted in the control by eastern capitalists of the Atlantic mine, on Silver mountain, and the purchase of the old Knickerbocker mill and site, situated on and deriving its power from Clear creek. It is the purpose of the parties represented by Mrs. Atwood to sink the shaft on the Atlantic 200 feet below its present depth of 189 feet, and run either four or six levels to open up the immense body in a vein that will average seven feet between walls.

#### Freshwater.

A number of plans are being perfected for extensive development in the Freshwater district. Some are already well developed properties, others include some of the best prospects of the district, and are to be undertaken by newly organized companies. Experts who were recently here from the east took samples from different properties, had tests made and expressed delight with the result, the assays giving all the way from \$4 to \$70 in gold per ton, from only prospect development. The nearness of the Freshwater district to Cripple Creek, the two districts practically joining, along with the splendid outcropping of gold-bearing veins all over this district, catches the eye and inspires the confidence of every visitor who knows aught of mining.

#### Idaho Springs.

The Quaker company, operating the Monte Cristo property on Spanish Bar, recently began a cross-cut from the bottom of the shaft for the purpose of reaching a parallel vein some 35 feet away. This has now been reached and the streak of high grade ore running \$100 per ton is about 12 inches wide. With it is some milling ore. The streak will be drifted

on and the company can begin the shipments of this class of mineral very soon as stoping ground is opening by this work. The company is also working on the Monte Cristo vein, and has a big body of milling ore in sight. The intention of the management is to drive the adits ahead and reach the big porphyry dikes lying several hundred feet to the north.

### IDAHO.

The mineral production of the State of Idaho, for the year just closed, as estimated by the officials of the government assay office in Boise, from the statistics so far gathered, was: Gold, \$2,500,000; silver, 5,500,000 ounces; lead, 100,000,000 pounds. Computing the silver at the coining value and lead at 3½ cents, gives the following figures:

Gold.....	\$ 2,500,000
Silver.....	7,100,000
Lead.....	3,500,000
Total.....	\$13,110,000
Production in 1896.....	11,752,845
Increase.....	\$ 1,358,155

Manager Huntley, of the De Lamar, says that his company are still prospecting vigorously, their intention is to exploit the property thoroughly. Power drills will be introduced, and a 60-drill compressor is on the way, the boiler to run same is being set up now.



GOLD HILL AND WARREN HOISTS

The Cambria Company, in the Marquette Range, has a contract for 10 car loads a day for the Chicago furnaces of the Illinois Steel Company.

The ore body in the Cundy mine has now been opened up for about 600 feet in length, and is 45 to 50 feet wide. It is the only body of magnetite opened on the Menominee Range.

The Groveland property, on the Felch Mountain Range, is to be unwatered. There is a small body of ore running 48 per cent iron and low in phosphorous, but containing a high per cent of alumina. Several thousand tons of ore were mined, washed and shipped in 1890. No work has been done since then, and the machinery has been removed to the Columbia and Mansfield. J. T. Jones of Iron Mountain is interested in the new undertaking.

The new shaft in the Columbia mine, in the Crystal Falls district, is now down 75 feet and is in good ore.

### MISSOURI.

Deerfelt & Co. has a lease on the Big Russe ground, north of Turkey Creek, and has put in a 10-inch lift pump and other machinery. Three years ago, this was one of the largest producers in the district.

On the Short Creek lease, west of Joplin, Holmes, Miller & Co. ran its plant but four days last week and produced 22 tons of top-price zinc ore. It is also producing from 15,000 to 20,000 lbs. of lead weekly.

The Opal Mining Company, has built a steam concentrator at its mine on the Beckwith lease near Cartersville, and are producing from 60,000 to 100,000 lbs. of lead ore weekly.

The Pearl C. Mining Company, after prospecting for several weeks, has developed a large face of zinc ore at 140 feet in timbering ground, with enough water to run the plant. This started two weeks ago and last week made 32 tons of high grade zinc ore. The company has a lease on 20 acres at Midway.

The Silver Dick Mining Company will start up this week after altering the jigs and will turn in over 60 tons of zinc ore.



## MONTANA.

## The Butte District.

As yet nothing in history is comparable to the manner in which the people of Montana have spanned the continent with civilization and the marvel seems all the greater when we reflect that most of the progress has been accomplished almost entirely during the past twenty or thirty years.

In less than it took our ancestors to journey half way across Central Europe, our race has made its way across America, surmounting on its way the great mountain ranges, which in any other age and to any other people would have been impossible.

But a few years ago Butte was content to be known as a "mining camp," making no metropolitan pretensions, but today it is known as one of the most prosperous and cultured cities of the West. Neither state nor national government has helped it in any material way, still the city was built and it is not surprising to those acquainted that it should be prosperous.

We herewith present a view of the Washoe Copper Company's Gold Hill and Washoe Hoists. This company was incorporated in the latter part of 1895, but since its organization has acquired two very valuable new copper properties located on the north-western limit of Butte City, Montana, also several smaller properties.

These two claims are known as the Gold Hill, No. 1, and the Washoe adjoining each other. Considerable development work has been executed on the Gold Hill. Drifting on the lode was continued until the value and extent of the veins were found to be satisfactory, proving the property to be all that was expected at the day of purchase. A fine hoist was erected on the premises suitable to sink several hundred feet deeper. Arrangements to treat the ore and work was resumed the early part of 1896.

The Washoe, the other important claim of this company, has also been developed to about the same depth and extent. It is generally understood that this company is backed by Marcus Daly and when the Anaconda Company increases its present plant sufficiently to treat additional ore, these two properties will be among the producers of the Butte District. As it now is, they are like a large number of other valuable properties there, they are held as a reserve and in the event of anything happening at the large producers they could in a few days be put in condition to take their place. Several of the companies own two or three hundred mining claims in the Butte, while as a matter of fact less than fifty are now being worked for the extraction of ore.

W. G. Gallagher is shipping a large lot of ore from the Tilden mine, near Argenta.

The Royal Gold mine and mill at Royal, Granite county, has been shut down indefinitely. Scarcity of ore is given as the cause.

The Western Mine Enterprise Company has declared its fifth dividend, of 20 cents a share, amounting to a total of \$25,000. The company is one of the most progressive and substantial in the state. Its chief officers are J. E. Rickards, president; A. J. Huneke, secretary; and Carl Hand, manager.

The Washoe Copper Company will, it is said, pull the pumps from the Paulin, and allow the mine to fill with water. It is a good property with a vein nearly 80-feet wide

containing copper. The mine will not be injured by filling with water, and work will doubtless be resumed at an early date.

A strike of good ore has been made in the Columbia mine, seven miles west of Whitehall, owned by Senator C. W. Hoffman and other Bozeman men. Work has been going on several months, and the development shaft has reached a depth of 320 feet. At 320 feet a crosscut was run, which has tapped the vein. The owners of the Columbia have shown great faith in their property, and their judgment seems to be making a permanent property.

It is said that a new Butte Company has secured a bond on the Hesperus lode for \$400,000, and the property will be so developed as to demonstrate its value. The deepest shaft on the Hesperus lode is that sunk by the Parrot Company when the sum of \$30,000 was spent on a compartment shaft, which was sunk at that time to a depth of 230 feet. The shaft went down through solid granite and only an occasional stringer of copper ore was found, none of it of sufficiently high grade or of such size as would make it profitable to ship. After the Parrot Company gave up the bond on the property without doing any cross-cutting at all, the Hesperus Leasing Company was formed, Silas King and others being interested, and the Parrot shaft was utilized for the purpose of cross-cutting north and south a distance of about 200 feet. To the south of the shaft 190 feet of lead was cut, which was 15-feet wide and it contained some good ore, though not a sufficient quantity to pay to ship.—*Western Mining World*.

## NEVADA.

## Gold Creek.

It is reported that Gold Creek, Elko county, may come out allright. The people who started it were amateurs at mining. Of the more than \$600,000 which was expended there, not enough was spent in following ore to develop any of the well known quartz ledges ten feet. It is also believed that all the work done there could have been accomplished by miners for at most \$100,000, and possibly for half that sum.

## Satisfied with the Outlook.

Otto Stalman has returned to Salt Lake City from Cherry Creek, Nevada, where he is at the head of the company which means so much for that country, and says the Glasgow and Western Exploration company's mill started up the last of January on sixty tons a day with a capacity of 100 tons daily. At the company's property at Golconda the mill is now in operation with results which Mr. Stalman says are most satisfactory to him, while work on the smelter is progressing steadily, and the plant promises to be in operation the next ninety days. The smelter will have a capacity of 150 tons a day.

## A Humboldt Mine.

J. C. Pierson returned the first of the week to Dayton, Nev., from his gold mines in Humboldt county, near Humboldt House. It is understood that Capt. Davis of Dayton is interested with him in the property, which Mr. Pierson considers quite valuable. The mines are situated in Black canyon, only about six miles from the railroad, and a small force of men is now at work developing them. So far

the ledges show ore that will average close to \$100 per ton in gold, and if the same value is contained in the ore as the ledges go down, the property will certainly prove to be a very valuable one. Should development work prove this, a crushing plant will be erected and the material be treated by the leaching process, which has proven so successful in working low grade tailings, etc.

## NEW MEXICO.

Output of Hillsboro gold mines for the week ending Thursday, Feb. 3rd, 1898, as reported for *The Advocate*:

	Tons
Wicks .....	25
Hill .....	26
Richmond.....	35
Happy Jack.....	5
Snake Group.....	85
Opportunity.....	20
Sherman .....	5
Prosper.....	5
Eighty-five .....	5
Rex (silver-lead).....	5

Total .....

Total output since Jan. 1, 1898.— 950.

## Bland Notes.

A number of now idle mines near Bland, it is said, will begin work at an early day.

Alex. Conrad is striking some fine ore in the development work on the Aunt Betley in Peralta canyon.

Messrs. Clausen and Williams are making ground in the main tunnel of the Julia, their valuable property in Colla canyon.

A big tunnel scheme that will cut several of the finest leads of gold quartz in the district is forming with the assurance of an early realization.

The Ellen L. tunnel is making more rapid progress than at any time heretofore, and is now within a very short distance of one of the best and richest veins of gold quartz in the Cochiti district.—*Bland Herald*.

## OREGON.

San Francisco parties have purchased the Oregon Bonanza mine at Ashland, for a cash consideration of \$4,000.

A rumor is rife that the Sturgis mine on Forest Creek has been sold for \$30,000, the transfer to take place early next month.

A 5-foot vein has been struck in the Baby mine, at Ashland, owned by Messrs. Monegan & Mason, of Spokane, which goes 80 to the ton. One streak of gold is reported as 14 inches and another as 16 inches wide. The gold is being hand sorted and sacked and will be sent direct to the smelter.

The well known Hampton & Lewis placer mine, on Grave Creek, is running night and day with two giants in constant operation and a force of 20 men. They will probably run until next June, when they expect the largest clean-up ever realized from this valuable property.

A new quartz discovery is reported on Alt-house. Frank Harlig has a 14-foot vein between walls, from which the ore shows free gold in abundance, and the showing is reported to be as good as was the Miller Ledge



when it sold for \$28,000. There is only a 20-foot cut run across the ledge with a 10-foot face.

Word comes from Baker city that the \$750,000 deal for the Bonanza mine near that city is off. The deal involved a commission of \$250,000, said to be the largest ever carried by a mining sale in the Pacific Northwest. The collapse is the result of a lawsuit over the division of the commission, and with collapse the hopes of three Spokane men to the \$250,000 may vanish into thin air.

## SOUTH DAKOTA.

Slabs, 6 feet long and 4 inches thick, of onyx, have been gotten out of the mine near Pringle, Custer County. The stone is pronounced excellent by Eastern experts. Some of it is dark and takes a nice polish.

At the third annual meeting of the stockholders of the Holy Terror, held in Milwaukee, on January 13th, the regular 3 per cent monthly dividend of \$9,000 was declared. The annual report showed that the company, with a 10-stamp mill, produced \$180,266 in 1897. The company expended \$15,000 during the year for new machinery, etc. It was stated that twenty additional stamps would soon be put in operation. The following directors were elected: John J. Fayel of Keystone, John S. George and Charles M. Kipp, Milwaukee. The officers were then re-elected as follows: President, John S. George; vice-president and manager, John J. Fayel; secretary and treasurer, C. M. Kipp.

Articles of incorporation of the Black Hills Coal and Iron Company have been filed for this company at Rapid City, Pennington County, with a capital of \$1,500,000, incorporators, William T. Coad, Charles T. Matteson, John B. Henry, Rapid City; James Conley, New York; Joseph H. Muhike, Chicago.

## UTAH.

The Ajax Company is developing and extracting ore regularly, the last five carloads netting \$3,600.

The Bullion-Beck mines are all making a very gratifying showing, especially below the 900-foot level.

Ore from the Centennial-Eureka continues to arrive in Salt Lake City. The mines are in a splendid condition.

It is expected that a dividend from Chloride Point will be declared during this month.

The Mercur annual reports showed receipts of \$776,704.30, and disbursements, including \$311,000 in dividends, of \$587,732.20, leaving cash on hand \$178,972.10. The recovery of values from the ores treated was \$6.47 per ton at a total cost of \$2.57½. The mines are in admirable condition with much virgin ground opening up in splendid shape. No change has been made in the directory.

Mammoth paid its dividend Feb. 2. The annual reports showed receipts of \$453,046.04, of which \$251,038.54 was derived from the gold ores produced, being over 50 per cent. In the treasury the company has a reserve of \$59,805.41. The properties are in excellent condition, with the earnings on the increase.

Swansea has declared its February dividend. The mine is in first class condition and development work has been kept in advance.

## Geyser-Marion Sold.

George F. Downey, Jan. 31, contracted with the stockholders of the Geyser-Marion to pay them, at the end of four months, \$450,000 for their property, and the sampling of it will begin at once under experts, the identity of whom Mr. Downey refuses to disclose at this time. Whom Mr. Downey represents in the big deal is a question which is equally in the dark. Some of the stockholders have expressed a conjecture that it is Capt. J. R. De La Mar who has associated himself with the undertaking, but it is stated this is erroneous. Others surmise that the title to the property is going across the big pond and from all that could be learned this is the more reasonable of the two theories. Manager John Dern would surrender no more information concerning those for whom Mr. Downey has taken the option than would the promoter himself.

Manager Dern, who was called on to preside over the mine on Oct. 1st, last, submitted his formal report some time ago in which reference was made to the fact that for the three months ending Jan. 1st, the gross earnings of the company had been \$90,873, while for ten months and twenty-one days, the period since the company was organized, the gross receipts had been \$148,235.92, with disbursements of \$149,711.46, leaving an overdraft of \$1475.98. Since his administration began the report shows that during the three months the gross output has been 13,367 tons, the proceeds of which reached a total of \$48,311.07. The net saving per ton on the ore has been \$3.80, the cost of mining \$1.14 and the cost of milling 82 cents a ton. During the three months of Mr. Dern's incumbency he has paid \$15,218.36 for mining and \$10,924.44 for the milling of the ores.

The report having been received and placed on file, the following board of directors was unanimously elected:

John Dern, Ed H. Alris, Matthew T. Gishorn, J. T. Hedges, George F. Downey, A. Hanauer, Jr., and George Dern.

The board will meet at an early day to elect the officers to serve them for the ensuing year.

## Park City Items.

A shipment of first-class ore was made from the Ontario mine the first of the week.

It is understood the Anchor is making up a 100-ton shipment of crude first-class ore.

The annual meeting of stockholders of the Daly-West Mining Company will be held in Salt Lake on the twenty-first day of next month. It is apt to be a momentous gathering.

## ORE SHIPMENTS.

Following are the ore shipments from the McIntosh Sampler for the week:

Silver King.....	960,580
Anchor concentrates.....	251,980
Ontario.....	257,580
Total pounds.....	1,470,140

## WASHINGTON.

(Extracted from Miner and Electrician.)

The work of pushing the big tunnel under Palmer Mountain, Okanogan County, goes on with unabated energy. At the close of the year the tunnel was in over 900 feet, and it is satisfactory to note that several veins have been encountered carrying gold, which assay well. The company owns 27 claims.

Dell Hart, who has been superintending the work on the Triune mine, one of the richest producers in Okanogan County, has closed down operations on account of his being called to Chicago on business. On the property is an excellent five-stamp mill, which, during the past year turned out bullion regularly.

"On the Peoria, two and one half miles from Silver, up the Methow River," said Mr. J. P. Schmuck, "the shaft is down 50 feet, and a cross-cut has been started in the 44-foot level, which is in twelve feet, in ore. The tunnel in forty feet, fifteen feet of which is also in ore. There are several car loads of ore on the dump, which averages \$28. Only a small force are at present employed, but the showings are exceedingly good for the amount of labor performed. The ore is gold-copper and there is an immense body of it already exposed."

The Bonanza near Bossburg, in Stevens County, is shipping three to five car loads a week. The ore is silver-lead and immense in quantity.

The Little Six group, on Huckleberry Mountain, in Stevens County, has let a contract for a 200-foot tunnel.

Work on the quarries of the United States Marble Co., near Valley, in Stevens County, is being actively pushed along. A fifty-foot floor has been cleared on the face of the bluff for working purposes, so that the men may be in position to take out the marble. Mr. Nordyke, the secretary, whilst in Chicago, obtained orders for several carloads of marble, one car-load of onyx being for immediate shipment.

## GOLD MILLING IN THE BLACK HILLS.

BY PROF. H. O. HOFMAN,  
Of the Dakota School of Mines, Rapid City, Dakota.

[Continued from our issue of Feb. 1st.]

Subjects treated upon in preceding issues are as follows:

### I. THE ORES.

*Character of the Ores.*  
*Sorting of the Ore.*

### II. ENUMERATION OF MILLS.

### III. OUTLINE OF PLANT AND PROCESS.

### IV. GENERAL FEATURES OF THE MILLS.

*Distribution of Power.*

*Supply of Water and Fuel.*—A regular supply of water is a prime necessity in milling. In this district it is chiefly furnished by two companies, at prices varying from 50 to 75 cents per stamp per day, the supply being brought in ditches. In winter, water becomes scarce, and then the mills of the Homestake management are supplied in part by pumping from the Homestake and Deadwood-Terra mines. This water otherwise runs to waste. The big Highland mill would be obliged to stop four months each winter if the tailings of the Homestake, Golden Star and Highland mills were not settled, and the clear water pumped back into the supply-tank. The method by which this is done is simple and effective. The tailings of the three mills are discharged together into the creek called Gold Run. A little way further down, this broadens, and is closed by two dams, one below the other, forming two reservoirs. The upper overflows into the lower, which is four times



its size, and this in turn, has its overflow into the bed of the creek. The dams consist of cribbing, filled up solidly with waste rock. On their upper sides they are lined with watertight planking. Down the middle of this runs a wooden box, three sides of which are made of solid plank, the fourth being left open. When the reservoir is to be filled, this box is closed by pieces of heavy plank placed transversely. As far as the mere filling of the reservoir is concerned, the box might as well be closed by one solid piece, but the object of a number of pieces is to discharge the water gradually. This is done by removing the pieces, one after another, as the water is lowered, that the sands may be kept in suspension and carried through the culvert. Were the box opened at the bottom or to its full height at once, the sands would be carried into the culvert in such a quantity as to clog it. This culvert in which the box ends, passes through the dam and under the lower reservoir and lower dam to the bed of the creek below. The lower dam is arranged the same way. When the reservoirs are not in use, the water of the creek passes off through the culvert. When they are to be filled the boxes are closed. The water accumulates in the upper reservoir until after six hours, it

and up the opposite height, until it finally reaches the point where timber is still to be obtained. This road, as soon as spring opens, is employed in transporting the wood and timber which have been cut and stored along its line, and is in constant use until the heavy snows block it for the winter, generally from January till April. It has three branches, towards the three towns where the mills are situated, and communicates directly with these by means of long wooden chutes, down which the wood is discharged. These are from 700 to 1,500 ft. long, running down the slope of the mountain. The chutes, 25 in. broad by 12 in. deep, are made of 4-in. plank. The bottom and 9 inches of the sides are lined with  $\frac{1}{2}$ -inch iron. The fall of the chute is 6 inches to the foot until the curve begins, when it is  $4\frac{1}{2}$  inches. This continues to the nozzle, which is elliptical. When the chute is in use, a small current of water is passed through it to prevent the iron from becoming too hot, and also to act as a lubricator. The cordwood unloaded into the top of the chute, passes down the incline with great velocity. At the nozzle it is deflected from its course, and, through the momentum obtained in its downward passage, shoots up into the air and drops some distance off on the wood

foundry iron and worn out castings. These are also sometimes bought at one cent a pound. The casting is all done in sand, with the exception of the rock-breaker shoes and dies and the faces of the battery-dies, which are chilled.

In the machine shop, which is a very complete establishment, all the necessary repairs are made. This is the only good shop in the district, and does the necessary work for outside companies also.

#### V. THE MILLS IN DETAIL.

The six mills under the Homestake management (that is, all the mills here described, except the Caledonia) have the same patterns for all parts needing frequent renewal. This greatly reduces the amount of material kept on hand and the labor and cost of repairs.

**Grizzlies.**—These are coarse screens, upon which the ore, arriving from the mine, is dumped and separated, the screened fines dropping directly into the bins. This relieves the breaker of the ore that does not need to be crushed, and only the coarse ore has to be shoveled into it. They are 3 to  $4\frac{1}{2}$  feet wide, 10 to 14 feet long, and set at an angle of about 40 degrees, representing a rise of  $\frac{1}{4}$  in. per ft.

TABLE III—Shafting, Breakers and Belts.

MILL.	LINE-SHAFTS.			ROCK-BREAKERS.				CHARACTER AND SIZE OF BELTS									
	Number.	Diameter in inches		Number.	Main to Line Shafts.				Line to Cam-Shafts			Line to Crusher Counter-Shafts			Crusher-Counter to Crusher-Shafts		
		Near Engine.	At Opp. End.		Type.	Type.	Ply.	Width.	Type.	Ply.	Width.	Type.	Ply.	Width.	Type.	Ply.	Width.
Homestake, - - -	1	7	4½	5	E	.....	.....	G	5	14	H	.....	18	G	4	9	
Golden Star, - - -	2	9	4½	6	E	G	6	28	G	5	16	G	5	12	G	5	10
Highland, - - -	2	7	4	6	E	H	.....	41	G	5	12	G	5	12	.....	.....	.....
Deadwood, - - -	1	7	4	4	E	.....	.....	G	5	12	G	5	12	.....	.....	.....	.....
Golden Terra, - - -	1	7	4	4	E	.....	.....	G	5	12	G	5	12	.....	.....	.....	.....
Father de Smet, - -	2	5½	3¾	5	E	.....	.....	G	6	24	G	5	12	.....	.....	.....	.....
Caedonia, - - -	2	5 5-16	4½	1	F	G	5	28	G	5	14	G	5	12	.....	.....	.....

R—No. 5 Blake Rock-breaker.

F No. 6 Gates Rock-crusher.

G—Rubber.

H—Leather.

overflows, leaving all the coarse sands in the upper reservoir, and carrying with it only the finer slimes, which settle in the lower one. From this the clarified water is pumped, at the rate of 60 cubic feet per minute, into the Highland tank, 200 feet above. The coarse sands are removed from the upper reservoir every twenty-four hours. In order to do this the transverse planks closing the discharge are removed, one after another, and the water passes off, carrying the sands with it. As this process takes four hours, and the filling six, there are fourteen hours of overflow into the lower reservoir, where the slimes settle. These are removed once in two months in the same way.

The fuel for the mills under the Homestake management is supplied by the "Black Hills and Fort Pierre Railroad Company." This road, with about thirty miles of 3-ft. gauge track, runs along the divide between Gold Run and City Creek, terminating at a point about fourteen miles south of Lead City. The whole section was originally heavily wooded, but has been quite denuded by the constant demands made upon it. The railroad is very winding and is quite a feat of engineering. It runs down the slope into Whitewood Creek,

pile. In order to discharge the wood on a somewhat large area, the nozzle is made movable. The Caledonia mill has its wood hauled by teams, but it is making experiments with soft coal, as the price of a cord of wood in the district is six dollars.

**Auxiliary Arrangements.**—As the thermometer often sinks to forty and fifty degrees below zero (Fahrenheit) the mills and the water used in them have to be warmed. This is generally done by the use of steam. Along the ground-floor, in front of the apron-plates there runs a sheet iron drum, 18 inches in diameter, through which the waste steam of the engine is conducted. The battery-water is prevented from freezing by steam coils passing through the supply-tanks.

Fire-plugs with the necessary hose attachments, are placed at regular intervals, to be used in case of accident.

To reduce the cost of repairs and renewals, which is so large a part of the expenses of gold milling, the Homestake company has a foundry, where the rock-breaker shoes and dies, pitmans and toggle-plates, mortars and dies, boss-heads, tappets, thimbles for props, cams and hubs of cam-shafts, pulleys, and all shaft-boxes are cast, from No. 1 and No. 3

They are made generally of wrought iron bars, 1 in. wide and 2 to 4 in. deep, held in place,  $1\frac{1}{2}$  to 2 in. apart, by three or four, sometimes five, 1-in. iron rods, provided with washers at the proper intervals. Mr. Bowie gives 2040 pounds, as the weight of a grizzly at the Father de Smet mill,  $4\frac{1}{2} \times 12$  ft. in size, with 24 bars, 1 in. wide by 2 in. deep, and  $1\frac{1}{2}$  in. apart. The grates last about four years. In some instances old wrought-iron rails, with base turned up, take the place of the standard rectangular bars; but they do not last much over one year.

**Rock Breakers.**—All the Homestake mills use the Blake.\* The coarse ore, rolling down from the grizzlies, collects on the crusher-floor and is fed by hand into the mouth of the breaker on the same level. From the crusher it passes into the bins which have already received the fine ore from the grizzlies. The No. 5 breaker used (the largest pattern in the market) has a receiving capacity of  $9 \times 15$  in., is set to crush from  $1\frac{1}{2}$  to  $1\frac{3}{4}$  in., and is run 20 hours out of the 24, each crusher being calculated to serve 20 stamps. The amount crushed per day is not known, as there is no

\*Breakers of the gyratory Comet type now supersede the Blake in most large stamp mills. Fraser & Chalmers.



easy way of determining how much of the ore in the bins has passed through the crusher. If one-fourth of the ore (a probable proportion in view of the slaty character of the ore,) passes through the screens, escaping the breaker, and if 20 stamps crush 90 tons of Homestake ore in 24 hours, the amount crushed in 20 hours by one crusher is  $67\frac{1}{2}$  tons, or 3.4 tons per hour. This small figure, as compared with the capacity of the crusher, which necessitates the breaking up of the ore—a serious matter, occasioning much delay. No part of the mill work is so laborious as this breaking and feeding of the ore, which has to be done by hand.

The wear and tear of material in a crusher is comparatively small, a shoe lasting two months, a die four months.

The small receiving capacity of the No. 5 Blake is a marked disadvantage to it, in comparison with the Gates crusher, lately introduced at the Caledonia. The ore of the Caledonia mine breaks rather coarse (that is, it does not show much of the slaty character of the Homestake ore), and is dumped immediately into the hopper of the crusher without the use of the grizzly. With about the same horsepower as three No. 5 Blakes, and set to the same size, one No. 6 Gates crusher (with three receiving openings, each 12 by 18 in.), attended by one man only, crushes 200 tons in 10 hours. When the three Blakes were in use, it required 20 hours and 5 men to produce the same results. Mr. T. L. Skinner, the superintendent, says in his last report that this new crusher saves him \$27 a day. In order to make the iron head last longer, he uses three sets of concaves of graduated thickness, the thinnest first, and so on. When, after some time, the head and first set of concaves have become so worn as to increase the width of the discharge above  $1\frac{1}{2}$  in., the second set is introduced; and when they in turn wear thin, the third. By the time these are worn down, (after about five months), it becomes necessary to replace the head. The disadvantage of the Gates Crusher is its enormous weight (No. 6 weighs 30,000 lbs.), and the consequent difficulty of transporting it, especially in some mining regions.

The best arrangement for a large mill seems to be to use a still larger Gates crusher (No. 8, with receiving openings 18 by 48 in.), set to crush coarse, and discharging into two No. 6 crushers, set to crush fine. Thus the largest pieces of rock any man could handle would pass directly into the crusher, and the breaking by hand in mine and mill would be reduced to a minimum.

The smaller Gates crushers, with correspondingly small mouths, are not to be preferred to the Blake crushers.

**Ore-Bins.**—These receive the ore from the grizzlies and crushers, directly over them, and discharge it through chutes into the hoppers of the feeders. They are triangular, with one vertical side, facing the battery and reaching down to the cam-floor. Just above the latter are the openings (one for each feeder) through which the ore passes downward into the chutes, terminating in the hoppers of the feeders. The quantity of the discharge is regulated by a sliding door. In a double mill the inclined bottoms of the two bins diverge, leaving an open space between them which has the shape of an inverted V. This arrangement of bins is common to all the mills except the Father de Smet.

The bottoms of the bins, 3 in. thick, are made of 1 in. board, running lengthwise, with 2 in. plank, placed at right angles upon it crosswise. The bottom and sides are carefully

braced with strong beams. There are no separate compartments of special arrangements for directing the ore towards the discharge-opening. The descending ore soon wears out such contrivances. It is advisable to line with iron the upper part of the bottom on which the ore drops from the grizzlies and crushers. Otherwise it wears out much faster than the middle and lower parts, which last 5 to 6 years.

It is best to make ore-bins as large as practicable, so that, in case of accident in mine or at rock-breakers, the mill need not stop. The capacity ought never to be less than one full day's supply. By multiplying in each of the three double mills, the horizontal distance between the two sets of batteries into the vertical distance between crusher-floor and cam-floor, the comparative size of their ore-bins can be approximately estimated. The following table shows the result. It is assumed that the distance between front of bin and battery, as well as the incline of the bin, is about the same in all.

Table IV. would show that, of these three double mills in which the batteries are arranged back to back, the Highland has the largest bin-capacity. In the Father de Smet, where the batteries discharge towards the center, the bins, built entirely above the batteries, and extending to the side walls of the building, have a still larger capacity, the figures, corresponding to the dimensions given herewith, being 57 feet by 30 feet, or 1710 square feet. There are, however, decisive objections on other grounds to this arrangement. The apron-plates are so over-shadowed by the inclined bottoms of the ore-bins above that the faculty of supervision, claimed as one advantage of this plan, is largely neutralized by the prevailing darkness, even at noonday.

**Feeders.**—The working capacity of a battery, and its exemption from unnecessary wear and tear, depend greatly on regular and equal feeding of ore. This used to be done by hand, but is now generally accomplished by automatic feeders, placed at the back of the batteries, and discharging either directly into the feed-opening of the mortar (the lip of the feeder reaching into the mortar-feed), or, as at the Caledonia, upon a small inclined iron-lined apron which leads to the mortar. By the latter arrangement, a little more room is left between feeder and mortar, and the feed opening can be narrower and longer, and the ore more uniformly distributed under the stamps. Thus, the Homestake mortar feed-opening is 24 in. long and  $4\frac{1}{2}$  in. wide, while that of the Caledonia, occupying the entire length of the mortar, is 52 in. long and only 3 in. broad.

The two ore-feeders used in the district, are the "Hendy Challenge" and the "Tullock Automatic." Each has a well-earned good name, the Challenge being, perhaps, more desirable for wet ores. Both right and left-hand feeders are used, the bumper-rod standing between stamps 1 and 2 or 4 and 5. The Challenge feeders, introduced with the new 20 stamps of the Caledonia mill are central feeders, the bumper-rod being placed next to the

central stamp. The rod is guided from the cam-floor, to which a piece of board, with a suitable hole for the rod to pass through, is fastened.

The comparative advantage of the two feeders may be summed up by saying that, while the sheet-iron plate below the hopper of the Tullock wears out quickly (with Homestake ore in two years), it is cheap and can be patched or renewed by any blacksmith; while the circular cast-iron carrier-table of the Challenge lasts seven years with the same ore, but is costly, and if anything is out of order with the gearing, it requires a shop and a machinist.

(To be Continued.)

## GENERAL NEWS.

### Improvements for Gold Mining in Alaska.

Paul B. Perkins, mechanical engineer and builder of gasoline engines and pumping machinery for several years in California, has designed a special engine and devices combined with it, which will greatly assist miners in securing gold from the mines of Alaska or other localities. In this design climate and transportation have been carefully considered. The prominent features are great power and strength with small weight and no one part weighs to exceed 150 lbs. for ease of transportation. The water used is automatically drained to prevent freezing. The hoisting device will elevate 1000 lbs. 100 feet, or 2000 lbs. 50 feet a minute. Thus material may be raised from shafts, sand from river bottoms, ores transported, timber moved, boats unloaded and heavy weights handled. With another device wood may be sawed from the tree, another device affords relief from the terrors of the mosquitoes. Compared with the ordinary steam outfits the weight is about one-third less. Being made mostly of steel, it is the equal in strength, while the ease of transportation gives it a broad range of uses. The cost is very reasonable.

With the addition of capital and help it is proposed to strengthen the manufacture and supply of the market. For full particulars call on or address Paul B. Perkins, 1025 North Alameda St., Los Angeles, Cal.

### Patents of Interest to Mining Men.

Townsend Bros., Solicitors of Patents, 9 Downey Block, Los Angeles, California, report the following list of recent Patents of interest to mining men.

January 18. No. 597,450. Gold Separator, J. M. Wishart, Oakland, Cal. The working surface is composed of a series of rectangular boxes having flat bottoms and a series of narrow channels having rounded bottoms secured between the boxes. The boxes and channels are of substantially the same depth.

January 18. No. 597,617. Ore Concentrator. Clinton J. Paine, National Military Home, Cal. Assignor of one-half to Axel S. Johnson, same place. The concentrator consists of a concentrating-pan having a central

TABLE IV.—Comparative Capacity of Ore Bins.

Name of Mill.	Horizontal Distance Feet.	Height Feet.	Product. Square Feet.
Homestake.....	44.5	14.25	634
Golden Star.....	36.0	23.75	855
Highland.....	46.0	22.75	1046



orifice in its bottom, an operating-shaft, a U shaped bracket connecting the operating-shaft with the pan. The bracket is removably secured to the operating-shaft by means of a screw-plug and a slot in the bracket which is used for adjusting the throw of the pan.

January 18. No. 597,628. Ore-Roasting Furnace. Henry Wehrum, Scranton, Penn. Assignor to the Lackawanna Iron and Steel Company, same place. Two independent structures are located side by side and have a space between them, said structures each contain a series of independent roasting-pockets and have means for independently supplying heat thereto. An ore-receiving platform bridges the space between the structures near the top and a railway centrally supported above the platform runs longitudinally thereof and allows the discharge of ore upon the platform beneath the railway for use in both roasting structures. The roasting-structures consist of a roasting-furnace, a combustion-chamber and means for supplying combustible material thereto, a chamber for collection of the waste gases, a roasting-pocket between the combustible-chamber and the waste-gas chamber. There are means for regulating the supply of air in the roasting-pocket at its lower end.

January 18. No. 597,629. Ore-Roaster. Henry Wehrum, Scranton, Penn. Assignor to the Lackawanna Iron and Steel Company, same place. The furnace is supplied with a combustion-chamber and has a series of short walls located therein, one above the other and staggered with respect to each other. A roasting-pocket is connected with the combustion-chamber by means of combustion-passages and a waste-gas chamber is connected with the roasting-chamber by means of combustion-passages from the roasting-pocket, the first named passages being staggered with relation to the second named passages and the second named passages being staggered with relation to each other.

January 4. No. 569,968. Amalgamator. James A. Hedge, Los Angeles, Cal. This machine is adapted for handling mill-tailings or placer. In placing the matter is first subjected to the action of a securer and then discharged upon a screen and thoroughly washed by jets of water discharged from rocking spray-pipes. A second screen is arranged below the first screen and the coarse material passes down a chute through riffles which are arranged below the amalgamator. Below the screens are arranged amalgamating-plates having quicksilver baths through which the gangue passes and finally enters the amalgamating-chamber, where it falls upon a revolving amalgamating-cylinder having amalgamating-wings fixed thereto. From this amalgamator the water and tailings are discharged upon the riffles, sluicing comparatively dry gravel which has been screened from the material. The coarse gold which will not pass through the screen is caught in the riffles.

January 4. No. 596,707. Assay Furnace. William Hoskins, La Grange, Illinois. A portable combined crucible and muffle furnace comprising a body portion provided with a crucible-chamber having an open top and a burner-opening at its base and provided with an arched muffle-chamber transverse of said body portion and communicating with the crucible-chamber through a passage in line with the burner opening. The muffle-chamber is of arched form and has an outlet in its top and an opening in its side, a muffle feeding through the side opening and is supported in the muffle-chamber which provides a space between it and the walls and the bottom of

the chamber. The opening in the top of the crucible-chamber is covered by a removeable cover.

January 4. No. 569,535. Apparatus for Extracting Gold & etc. from Dry Crushed Ores. E. L. Opermann, London, England. A retort is provided in which mercury is heated. A pipe connects the retort to the injector and a steam supply pipe is connected to the injector and the steam and mercury is turned into a series of perforated pipes which causes the mercury, vapor and steam to be blown upon the crushed ore. The mercury is mixed with the ore by means of rotating arms. Electrodes are carried by movable supports which form one terminal of a circuit and a metallic bottomed channel over which the ore passes forms the other terminal.

January 4. No. 596,719. Magnetic Ore-Separator. L. G. Rowand, Camden, New Jersey, Assignor to the Wetherill Concentrating Company, New York, N. Y. A conveyer-belt adapted to convey the material to be treated, and a discharge-belt passing over it at a point and at an angle therewith a magnet is placed above them at the crossing point and extends above the discharge-belt beyond the conveyer-belt. The pull-pieces of the magnet extend along the discharge-belt. The distance between the pull-pieces increases along the discharge-belt beyond the conveyer-belt.

## FOREIGN MINING NEWS

### BRITISH COLUMBIA.

(Extracts from the British Columbia Mining Critic)

It is stated that the Ruth, a prospering Slocan mine will shortly declare a dividend of \$75,000.

The Comstock mine at Silverton has just shipped to Nelson 275 sacks of ore. The consignors expect it to average rather over 100 ounces in silver and about 60 per cent. lead.

Kamloops men think very highly of this year's prospects of the development of their district of Coal Hill as a copper-gold camp. Considerable development work is in 1898 expected on the Erin, Pothook, Copper King, Iron Mask, Python and Iron Cap amongst the other claims.

The Fern mine of the Nelson district, has succeeded in making a record in producing speedy and satisfactory first returns as a free-milling and concentrating gold producer. Worked for less than three months, already a first dividend of \$10,000, or 5 per cent. on a capital of \$200,000, has been declared and paid, and it is confidently expected that another will shortly follow.

Superintendent Rives, of the Golden Cache mine, states that a new ledge has been followed up and down, widening out to two feet, with signs of further broadening. A hole put through two feet of this quartz showed drillings assaying \$101.98 a ton. Mr. Rives thinks that the main ledge has now been struck and that the mine will come out well. It is to be hoped that in this he may prove thoroughly correct.

The annual general meeting of the Atlas Mining and Development Company, Limited, which owns and operates the Monte Cristo claim, situated on Cayuse Creek, Lower Arrow Lake, near the town of Deer Park, was held in Rossland on January 17th. The newly

elected officers are as follows: Mr. A. W. Kenning, president; Mr. A. E. Kennedy, vice-president; Mr. P. Linnard, second vice-president; Mr. H. E. Arnold, superintendent; Mr. John Bray, secretary-treasurer. The officers with Messrs. J. H. Anderson and W. A. Thornton, make up the board of directors.

## PERSONAL NEWS ITEMS

Mr. JAMES of Randsburg, Kern county, California, a miner of note, was a caller at the JOURNAL office last week. He is developing some new properties that are showing up very fine—has three inch veins that show rich free gold on the surface.

MESSRS. THOMAS KRARNS and DAVID KEITH, principal owners of the Silver King, Park City, after an outing of several weeks on the Pacific, are again in Utah.

THOMAS GANNON of Fenner made the JOURNAL a pleasant call last week. Mr. Gannon is interested in some properties in the Fenner country and is very enthusiastic over the outlook for that section.

LOUIS M. LOPEZ, commercial agent of the Mexican National Railroad, states that large quantities of improved machinery are being installed in all the mines along the road. He looks for a very active year in mining in Mexico.

MR. GEORGE E. ROBERTS of Fort Dodge, Iowa, has been appointed Director of the Mint of the United States, to succeed Mr. R. E. Preston, who has resigned after nearly forty years' service in the Treasury Department. Mr. Roberts has been an editor, and has written a number of articles and pamphlets on financial questions. He is a man of high character and much ability.

MR. HORACE V. WIRCHELL, mining engineer, of Minneapolis, Minn., is in Chicago at the present time on business connected with a metallurgical process.

F. C. FENNER of Los Angeles, Cal., is interested in a good property at Bisbee, Ariz. He refused \$30,000 for it a short time ago. The ore contains copper and silver.

H. J. REILING, president and general manager of the Gold Dredging Company of Chicago and Bannack, Montana, has disposed of his interest in the company. He was among the first to successfully operate gold dredging plants in the United States. Mr. Reiling will devote his time to the building of dredging machinery and has removed his offices in Chicago to the Tacoma Building.

THOS. O. BRIEN of Needles has become owner of the Hidden Hill and Golden Queen mines in Providence Mountains, near Fenner, San Bernardino county, Calif.

MR. A. H. S. BIRD of Salt Lake, Utah, has begun operations on the Mother Lode in California, and for the next few months his headquarters will be at Placerville and Sacramento.

CHAS. D. LANR, the \$20,000,000 gold miner of San Francisco, is in Los Angeles, having arrived the 11th inst. in company with C. A. Towne.

MR. W. R. TRUBBER, a Chicago man, is operating one of the largest mining properties in Michoacan, Mexico—one that carries gold, silver and copper. The mine is located near Huatamo.

MR. F. E. RUTLAND of London, England, representing the Occidental Syndicate, has been in the Rat Portage district, Ontario, and is going to the Klon-dyke.

HERBERT LONG and J. J. LONGRAN left last week for the Colorado river copper belt, taking in the Virginia Dale, Engle Mountain, Chuckawalla and McCoy districts.

On account of the ever increasing demands for antimony, both refined and raw, new deposits are sought after. We now have a gentleman who wants 100 tons of raw antimony. Any information as to per centage and prices, laid down in Los Angeles, will oblige the JOURNAL, and may prove of advantage to the informant.

MR. W. A. CARLYLE, provincial mineralogist of British Columbia, was lately in Rossland, B. C., in company with Mr. D. J. MACDONALD, who was recently appointed inspector of metalliferous mines for the West Kootenay district.



## THE MARKETS.

NEW YORK, Feb. 12th, 1898

The following are the Silver, Copper and Lead quotations for the last two weeks

	SILVER	COPPER	LEAD
Jan. 11	56 1/2	10 50	10 1/2
" 12	56 1/2	10 50	10 1/2
Feb. 11	56 1/2	10 50	10 1/2
" 12	56 1/2	10 50	10 1/2
Jan. 11	56 1/2	10 50	10 1/2
" 12	56 1/2	10 50	10 1/2
Feb. 11	56 1/2	10 50	10 1/2
" 12	56 1/2	10 50	10 1/2
Jan. 11	56 1/2	10 50	10 1/2
" 12	56 1/2	10 50	10 1/2
Feb. 11	56 1/2	10 50	10 1/2
" 12	56 1/2	10 50	10 1/2

The Silver market has ruled at low prices throughout the week although at the close it seemed to be firmer. It has been unfavorably affected by strikes in money markets in India, where there has been quite an appreciable increase in the rates of discount.

## COPPER

The New York market has been firm, but not much business has been done as home consumers are still provided with raw material. Quotations are Lake Copper 10 1/2 @ 11c; for electrolytic, 10 1/2 @ 10 1/2 c; Casting copper retail lots 10 1/2 @ 10 1/2 c.

## LEAD

It has been rather slow in movement as consumers are well supplied. We quote it @ \$3 67 1/2.

## SPELTER

There has been a large increase in the production and buyers in consequence are holding off.

New York quotations are \$3 75 @ \$3 90 and St. Louis \$3 72 1/2 @ \$3 75.

## ANTIMONY

It has been rather dull and we quote for Cookson's No. 1, Hallett's 7 1/2c, U. S. Star 7 1/2c, and Japanese 7 1/2 @ 7 1/2c.

## NICKEL

Business still continues on unchanged lines and no alteration in prices can be reported. We quote for New York ton lots 33 1/2c and 34c per lb and for smaller orders 35 1/2c and 36c.

## TIN

The demand for tin is quite good. We quote for spot and January \$13.75 and for future \$13.85.

## PLATINUM

Prices are now quoted at \$15 and \$16 per oz., New York. The London quotations are 58 @ 60 £ per oz. Supplies are not large and prices are firm. For chemical ware, best hammered metal, Messrs. Bimier & Amend of New York furnish the following quotations, the prices given below being respectively for orders of over 250 grams, for orders of over 100 and less than 250 grams and for orders of less than 100 grams. Crucibles and dishes, 57c, 58c and 59c per gram. Wire and foil are 55c, 56c and 57c per gram.

## QUICKSILVER

The New York quotation are at \$38.50 per flask.  
San Francisco quotations are \$30 for domestic consumption.

## POWDER

The market at San Francisco is fine with the current quotations.  
The quotations are as follows:  
For Hercules No. 1, from 11 1/2c to 17 1/2c, according to strength and quantity. No. 2, from 9c to 11c, according to strength and quantity.

## COKE

The market at San Francisco, Cal., is quoted as follows:  
English, spot, in bulk, \$11.00  
" in sacks, 12 00  
Cumberland, 10.00

## BORAX

The San Francisco market in Borax is firm with a good demand.  
The market is quoted as follows:  
Refined, in carload lots, in barrels, 40c  
Refined, in carload lots in sacks, 40c  
Powdered, in car lots, 40c  
Concentrated, in car lots, 40c

## THE MINOR METALS

Quotations are given below for New York delivery:  
Aluminum, No. 1, 98 per cent. ingots, per lb, 40c  
No. 2, 94, " " " " 38c up  
Rolled sheets, " " " " 38c up  
Alum-Nickel, " " " " 38c up  
Bismuth, per lb, 45c  
Phosphorus, per lb, 45c  
Tungsten, per lb, 70c  
Tungstic acid, 45c  
Perrhotungsten, 50 per cent, 45c

Variations in price depend chiefly on the size of the order.

## CHEMICALS

There is absolutely nothing new to report, but it is expected that before the current month goes by there will be higher prices and a more active demand from buyers.

Quotations generally are as follows:

## CAUSTIC SODA

Quotations for caustic soda domestic high test are \$1.75 @ \$1.85 per hundred lbs.

## ALKALI

Domestic, 58 per cent., 55c @ 60c, foreign 60c @ 65c carload lots.

## CARBONATED SODA ASH

48 per cent., 90c and 95c per 100 lbs. 58 per cent.

## BI-CARBONATE OF SODA

English, \$2.00 and \$2.25 per lb. American, bulk \$2.00 and \$2.25 per 100 lbs., according to brand.

## SALT SODA

For domestic \$1.55 per 100 lbs., less usual discounts, English, 60 @ 62 1/2c, for spot and 65c to arrive. Concentrated salt soda, \$1.40 and \$1.60 per 100 lbs.

## CHLORATE OF POTASH

Chlorate of potash is quoted @ \$9 12 1/2 and \$9 37 1/2 per 100 lbs.

## ACIDS

February has opened with an improvement as compared with last year and taken as a whole, the trade looks promising.

Prices are per 100 lbs. in New York and vicinity in lots of 50 carboys or over. Quotations are as follows: Acetic acid, commercial No. 4 \$1.40 @ \$1.55 redistilled, 28 per cent., \$2.00 @ \$2.15. Muriatic acid, 18 per cent., 1.00 @ \$1.50, 20" \$1.60 1.75; 22", 1 1/4 @ \$2, according to make and quantity. Nitric acid, 36", \$3.25 @ \$4.40; 40", \$3.75 @ \$4.75; 42", \$4.10 @ \$5.00. Oxalic acid, \$7.25 ex-dock and \$7.50 ex-store. Mixed acids, according to mixture. Sulphuric acid, 66 per cent., \$10.00 @ \$1.75. Chamber acid, 50" \$7.50 @ \$8 per ton at factory. Blue Vitriol, \$3.75 @ \$4.25 according to grade and order.

## BRIMSTONE

Quotations at present are \$20.75 @ \$21.50 per ton for best unmixed seconds, and \$20 @ 20.50 for thirds.

## MURIATE OF POTASH

We quote New York and Boston, 1.75 @ \$1.78c. Philadelphia and Norfolk, 1.76 @ \$1.79 1/2c; Charleston, Savannah, Wilmington and New Orleans, for 80 @ 85 per cent. basis of 80 per cent., \$1.78 @ \$1.81c in lots of 50 tons and upward.

## KALIN

Invoice weights as taken at port of shipment per ton of 2,240 lbs. testing 12.4 per cent. actual potash, equivalent to 23 per cent. sulphate of potash, \$8.80 @ \$8.90.

## NITRATE OF SODA

Business on spot has been good and the market appears to be rising in value. At one time this week \$1 85 @ \$1 90 for 100 lbs. was asked for spot nitrate, but sales were made at \$1 75 @ 1 77. To day \$1 85 is mentioned for spot, \$1 70 @ \$1 75 for near arrivals and \$1 55 for future shipments.

## FINANCIAL NOTES.

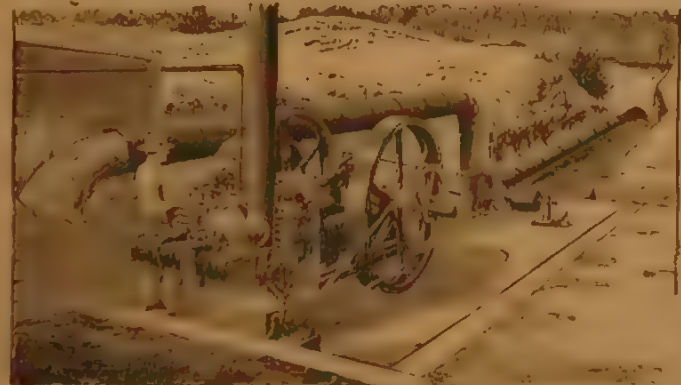
The comparative statement of receipts and expenditures issued by the Treasury Department shows that the total receipts for the month of Jan. were \$37,334,628, against \$21,316,994 for Jan., 1897. The receipts for the month include \$8,538,401 on account of the sale of the Union Pacific Railroad. Deducting that amount leaves the ordinary receipts \$28,796,227. The expenditures for the month aggregate \$36,896,711, an increase of upward of \$1,000,000 over January, 1897. The pension payments reached \$12,375,223 during the month. The deficit for the month, deducting the extraordinary receipts on account of the railroad sale, was \$7,901,484, against \$5,952,395 for January, 1897.

An examination of the operations for the seven months of the current fiscal year shows the following results, compared with the aggregate receipts for seven months, \$245,985,602, which amount includes nearly \$50,000,000 on account of the Union Pacific Railroad. Deducting the receipts on that account leaves the aggregate ordinary receipts \$187,537,379, an increase of upward of \$6,000,000 compared with the corresponding period of the preceding year. The expenditures for the seven months just closed foot up \$244,488,590, in which is included \$5,440,368 paid on account of the Pacific Railroad in the redemption of bonds, payment of interest, etc. Deducting that amount the aggregate expenditures for the seven months were \$239,039,202, which amount exceeds the ordinary receipts for the same period by \$51,901,823, these figures representing the deficit for the seven months. For the same months of the preceding year the deficit was \$43,854,791.

## Gold and Silver Exports and Imports.

At all United States ports, December, 1897, and years from January 1st, 1897 and 1896.

	Exports	Imports	Exports	Imports
Gold	\$4,171,192	\$2,070,490	\$4,171,192	\$2,070,490
Silver	\$6,041,859	\$12,551,282	\$6,041,859	\$12,551,282



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The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works in the Parker Ranch, Colusa Co., 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 200 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 214 Bay St., San Francisco.

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Gold Refiners and Assayers.

Our silver amalgam for replating copper plates is being extensively used by millmen. It avoids the necessity of sending plates long distances to be replated. For sale in small quantities, 50c per ounce, a reduction being made on all orders over 50 ounces. Experience proves our silver amalgam will catch more gold than when the copper is electroplated.

Our Mr. Smith owned and operated Smelting, Refining and Chemical works in Providence, R. I., for over 20 years.

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This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

### Gold and Silver Exports and Imports, New York.

For the week ending February 7, 1898, and for years from January 1st, 1898, 1897, 1896, 1895:

Period	Gold Exports	Gold Imports	Silver Exports	Silver Imports
Week	\$10,497	\$77,000	\$920,335	\$1,051,008
1898	11,092	2,152,847	4,685,957	8,084,180
1897	11,570	220,421	4,685,957	8,084,180
1896	9,100	9,910,012	4,685,957	8,084,180
1895	20,618,887	642,967	4,685,957	8,084,180

Of the gold exported for the week, \$1,862 went to London, \$9,770 to South America, and the balance to the West India, the silver went to London. Of the gold imported \$1,030,620 came from France, and the balance principally from Central and South America and the West India. The silver came chiefly from the latter ports, with \$11,764 from British Columbia and \$1,081 from France.

### Average Monthly Prices of Silver,

In New York per ounce Troy, from January 1st, 1898, and for the years 1897 and 1896.

Month	1898	1897	1896
January	75.77	61.71	67.15
February	—	61.71	67.15
March	—	61.71	67.15
April	—	61.71	67.15
May	—	61.71	67.15
June	—	61.71	67.15
July	—	61.71	67.15
August	—	61.71	67.15
September	—	61.71	67.15
October	—	61.71	67.15
November	—	61.71	67.15
December	—	61.71	67.15
Year	—	61.71	67.15

The United States Assay Office in New York reports the total receipts of silver at 102,000 oz. for the week.

### MINING STOCK MARKETS.

LOS ANGELES, CAL., Feb. 14, '98.

The week just closed has been one of little activity. The amount of shares sold has been small compared with the previous week.

Prices are unchanged and the market generally suffered somewhat under the pressure to sell. The majority of stocks are now selling far below the real value

and are, with the exception of one or two, considered good and safe investments.

East Amargosa stocks fluctuates to a more or less degree. Price will average about 50c. per thousand. Gold Bug showed a little more activity than usual, several thousand selling at \$5.

Magnetite has not showed much advance, stock is offered at 1 1/2c. per share. Lucky Star is also declining, shares are sold at \$2.50 per thousand.

Old Dominion stock has weakened somewhat, but none was offered below 2c.

Mohawk-Acton is a good trader but with a declining quotation. It sold as low as \$1.25.

Laurel Mountain has a steady sale at 2 1/2c. per share.

Pacific Consolidated still remains inactive. Quotations are at \$1.50 to \$2.00 per thousand shares.

Rand Mountain has been selling at \$1 to \$1.25 per thousand and has an excellent chance for an advance.

On account of a rich strike recently made in the Wedge the stock has taken an upward turn.

Amargosa is being offered at 12 1/2c. to 15c. per share, but no sales have been recorded.

The Val Verde seems to be off the market entirely.

SAN FRANCISCO, Cal., Feb. 12, 1898.

The news from the Comstock mines points to more active work in several and good results in others, yet it will take time, or until shares are better concentrated. Reports—and seemingly correct, too—are out that on the 1650-foot level important work will be started soon. In Sierra Nevada the ore found is quite important. So far as prospected, it goes about \$40 a ton. It will take two weeks to make connections for air and manway by an upraise, after which the level will be exploited to find the extent of the ore. In Alta prospects are improving, which encourages the management in the belief that a body of good ore may be uncovered. Fair progress is being made in the north drift in Utah. Soft porphyry is being passed through. In Sierra Nevada they are raising from Riley tunnel to make connection for air and other purposes. With this completed, exploiting this level will be in order as will extracting ore. The official letter reports taking out eighty-three tons, assaying from \$30 to \$40 to the ton. The impression prevails with some that this body of ore

will be found from 20 to 30 feet wide, yet it may not average so much all the way through. West cross-drift No. 5 on the 900-foot level is being pushed ahead at the rate of over 20 feet a week. Work is continued in the north drift on the 900-foot level in Union. The face shows porphyry, vein matter and clay seams. The letter from Mexican reports work only on the 1000-foot level going east. In Ophir cross-drifting to the west is being done on the 1000-foot and Central tunnel levels. It seems as if they ought to be nearing the west ledge on the former level. In Con. Virginia work is confined to and around the 1550-foot, 1650-foot, and 1750-foot levels.

SALT LAKE CITY, Feb. 12, 1898.

The mining share market this week was somewhat irregular and with gains in most stocks. The heavy payments of dividends and continued favorable reports from the properties produced a healthier tone for the market than presages a broadening effect on this class of investments. The enormous accumulation of money must in time exert a powerful influence and create new avenues for the employment of capital. It is looked for much benefit to be given to the mining interests by it the coming year.

On light business, Ajax held strong at last week's figures. Offerings are not heavy and the indications for better figures seem good. Alice was in good demand, and on no business fixed much higher prices. In the Bullion-Beech mines the demand was quite good, however, the stock just about held last week's prices. Little was done in Buckeye, and no change occurred in quotations.

Centennial-Eureka has held its annual meeting last week. Offerings of the stock were light, indeed. Chloride Point was held quite firmly near last week's figures. A dividend has been promised for this month, although not yet declared. Dalton was active but stationary, while the Dalys continued low and without feature. The new mill at the Dexter has started and the stock is much stronger. It looks like a purchase for a hold. Eagle was lower, while Pour Aces continued active under 4 cents.

The Geyser-Marion mines justified very much higher prices on the stock. Galena continued strong, but about unchanged. A much better feeling prevailed in Grand Central. Horn Silver was inactive, and Homestake remained about stationary.

After Mercury annual meeting, the stock developed new strength. Mammoth paid its dividend on Wednesday of last week, and notwithstanding the favorable reports made at the annual meeting, sold off heavily. Northern Light fluctuated considerably, closing without much change from last week's figures.

NEW YORK CITY, Feb. 10, '98.

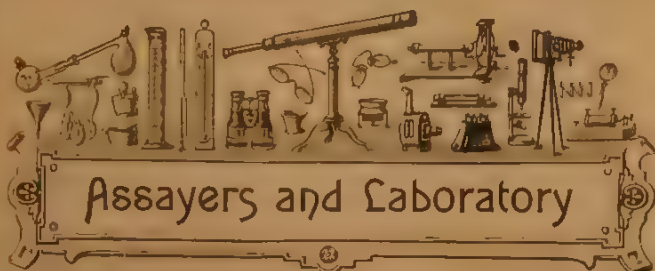
The market continues quiet and prices are a little off.

Of the Colorado stocks Lillie, with the second dividend just paid this year, sold at 79c., but receded to 69c. shortly afterwards. Golden Pledge changed hands at 50 1/2c. to 51 1/2c., and Elkton is down to 85 1/2c., while Portland has risen from 79c. to 87c.

The American Flag Gold Mining and Development Company, which operates the American Flag and Bennett Lode claims on Quartz Hill, in Central City, Gilpin County, Colo., has been listed on the Mining Exchange. According to the sworn statement of the company its capital stock, \$1,000,000, is non-assessable and fully paid; the par value is \$1. The incorporation papers were filed July 29, 1897. The officers are: President, Wm. C. Boschen; vice-president, H. L. McCarn; secretary and treasurer, Robert R. Ball. The board of directors consists of these gentlemen and W. C. Cuthbert and Hiram D. Faulkner. The New York office is at 30 Broad street. It is stated that the first record of this company was entered in the Gilpin County, Colo., clerk's office on December 27th, 1897, and the property has heretofore been worked by the Boundless Mining Company and the American Flag Gold Mining Company. The stock that is offered on the Mining Exchange is treasury stock of the new company, and this opened at 15 1/2c. on the day of listing and rose to 20c. at the close of this week.

**WANTED**, by a young man, a position as Assayer, etc. experienced, competent and has a good knowledge of all metallurgical operations. Good references. Address, T. K. JOURNAL OFFICE, Stimson Block, Los Angeles, Cal.

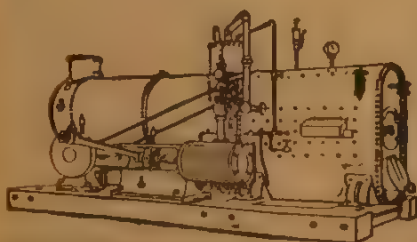
**WANTED**—Assayer wants position or can take full charge of Mine or Mill. Experienced and good references. Address, "MINHUB" care Mining Journal, Los Angeles, Cal.



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## MINING STOCK QUOTATIONS

## LOS ANGELES, CAL.

## ROSSLAND, BRITISH COLUMBIA.

By Method	—	Merrill	—
Combination	—	Ontario	—
Con T & P 'n'a.	25	Yellowstone	11
Diamond Hill	—		

## BOSTON

Aetna Con	4 00	Humboldt	—
Allouez	—	Illinois Steel	40 00
Anaconda	—	Kearsarge	17 00
Amold	3 00	Lake Sup Iron	—
Atlantic	22 00	Merced	4 75
Donanza	—	Napa Cons	6 50
Boston and C C	—	New Idria Mg	—
Boston & Mont	135	Old Dominion	20 25
Bute & Boston	20 50	Pineola	34 50
Calumet & Hecla	50	Pioneer	5 00
Catalpa	—	Quincy	110 1/2
Centennial	15 50	Ridge	—
Central	—	San Ysabel	—
Dominion Coal	21 50	Tamarack Jr	—
Dominion Ref	13 00	Tamarack	120 00
Franklin	—	Tecumseh	3 50
Gold Coin	2 00	Wolverine	16 00

## NEW YORK.

Alamo	03 1/2	Homestake	23 50
Alice	40	Iron Silver	—
Annetta	45	Mexican	30
Beat & Belcher	80	Mollie Gibson	19
Brimwick	05	Ontario	4 50
Bulwer	—	Ophir	—
Crown Point	65	Pharmacist	10
Con. Cal. & Va	—	Pymouth	—
Cripple Creek Con	08 1/2	Quicksilver	3 00
Dendy & d	—	Quicksilver pfd	11 00
Favorite	11 25	Sierra Nevada	—
Fortuna	04	Standard	1 50
Golden fleece	45	Union Con	—
Gould & Curry	45	Yellow Jacket	—
Hale & Norcross	—		

## COLORADO SPRINGS STOCKS

Alamo	03 1/2	Isabella	30
Anaconda	48	Iowa	—
Argonaut Junito	20	Jack Pot	05 1/2
Bankers	01 1/2	Jefferson	05 1/2
Ben Hur	02	Mollie Gibson	23
C & N	009	Mount Rosa	—
C & Manitow	02	Pharmacist	09 1/2
Creede & C C	—	Portland	70
C & Consolidated	05	Peoples	02 1/2
Garfield Grouse	04	Sacramento	02
Golden fleece	30	Star of the West	—
Gold & Globe	—	Union Gold	22
Gold Standard	03 1/2	Virginia M	02 1/2
Inley	300	Work	05
Ironclad	04 1/2		

Brown Dake	—	Magganetta	03 1/2
Cavil	002	Mohawk Action	01 1/2
East Armago	009	Old Dominion	—
Gold Bug	009	Pacific Con	01 1/2
Laguna	50	Rand Mt	02
Lucky Star	7 50	Wedge	02 1/2

## SAN FRANCISCO.

Alpha	—	Rochester	—
Alto Con	10	Gould & Curry	74
Andes	23	Hale & Norcross	1 05
Belcher	23	Justice	55
Best & Belcher	35	Mexican	35
Bodie	—	Ophir	—
Bullion	10	Overman	—
Challenge	28	Potosi	46
Chollar	50	Savage	26
Confidence	85	Sierra Nevada	97
Con. Cal. & Va.	1 0	Union Con	30
Con New York	—	Utah	07
Crown Point	17	Yellow Jacket	02

## SALT LAKE CITY

Alice	25	Little Pittsburgh	01 1/2
Ajax	25	Lower Mam	40
Alliance	15	Lucky Bill	—
Anchor	70	Malvern	—
Bogart	—	Mammoth	2 05
Buckeye	02	Maxfield	8 10
Bull Head	3	Mercur	8 10
Cent. Eureka	20 00	Morgan	12 1/2
Chloride Point	38	Northern Light	50
Dalton	—	Omaha	16
Daly	85	Oreana	4 00
Daily West	3 25	Overland	—
Dalton & Lark	07	Rebeyond Ana	—
Dexter	1 40	Santa Fe	01 1/2
Engle	02	Rover	—
East Golden Gate	—	Sacramento	20
Eureka Hill	—	Silver King	16 00
Four Aces	01 1/2	Silver Con	—
Galena	65	Sunbeam	02
Gemini	—	Sunshine	20
Geyer Marion	1 10	Swansea	1 80
Grand Central	60	So Swansea	1 27 1/2
Homestake	00 1/2	Utah	70
Horn Silver	1 50	Utah Con	—

Alberta	05	Josie Mac	12 1/2
B. C. Gold King	07	Josie	28
Beaver	10	Jumbo	75
Big Three	10	Knight Templar	05
Bluebird	07	Kootenay London	10
Bruce	10	Le Roi	5 00
Butte	01 1/4	Lilly May	19
Caledonia Con	05 1/2	Mabel	15
California	15	Mayflower	10
Camp Bird	05	Monita	18
Celtic Queen	05	Monte Christo	18 1/2
Centre Star	05	Morning Star	03
Colonna	24	Mugump	03
Commander	18	Nest Egg	05
Deer Park	12	Northern Belle	10
Della Colita	02	Novelty	09
Delaware	12	O. K.	10
Eastern Star	20	Palo Alto	05
Enterprise	20	Phoenix	13
Eric	03 1/2	Portland	10
Eureka Con	05 1/2	R. E. Lee	15
Evening Star	02 1/2	Red Eagle	04
Georgia	10 1/2	Red Mount View	—
Gerrude	10 1/2	Red Point	10
Golden Drip	15	Rossland H'mest'ke	05
Good Hope	03 1/2	Rossland, Red Mt.	20
Grand Price	03 1/2	St. Elmo	12
Great Western	08	St. Paul	12 1/2
Hait Brown	—	Silver Hill	04
Helen	04	Silverline	06
High Ore	04 1/2	So. Cross & W. Con	15
Imperial	12	Virginia	12
Iron Horse	20	War Eagle Con	10
Iron Mask	38	West Le Roi	21
L. X. L.	10	White Bear	11

## DENVER STOCK REPORT.

Aetna	003 1/2	Elkton	82
Alamo	02 1/2	Eureka	008
Anaconda	42	Garfield	23
Armadillo	004	Golden fleece	25
Consolidated	01 1/2	Gould & Curry	008 1/2
Argonaut Junito	—	Gold Standard	02 1/2
Bangkok-C-Bell	27	Inley	003
Bankers	02	Iron Glod	02
Ben Hur	04	Isabella	23
Bob Lee	04 1/2	Jack Pot	01 1/2
Boston & C C	01 1/2	Jefferson	08 1/2
Chimbarazo	002	Mollie Gibson	70
C. K. & N.	008	New Zealand	05 1/2
Colo. C. & M.	01 1/2	Peoples	08 1/2
C. C. Con	08 1/2	Pharmacist	08 1/2

## HELENA, MONTANA

Am Den & M Co.	1 00	Helena & Frisco	8 00
Bald Butte	2 50	Iron Mountain	—

## MEXICO

Name of Company	State	Price
Allanza	Hidalgo	5
Amistad y Concordia	"	24
Anglo Mex	Guajalato	710
Arceval y Anexas	Hidalgo	200
Asustiana y Anexas	Zacatecas	210
Bata Lda. Caba	Durango	100
Barloome de Medina	Hidalgo	100
Candelaria y An	Zacatecas	150
Candelaria de Potosi	"	20
Candelaria de Potosi	"	80
Candelaria de Chich	Durango	120
Canary	Hidalgo	250
Carman	"	80
Castellana y San Ram	Tepe	10
Cerro Colorado	Chihuahua	10
Cinco Senores y An	Guajalato	850
Concepcion y Anexas	S. Luis Potosi	280
El Oro	Guajalato	100
Rapahansa y An	Guajalato	1,200
Gold Lope	Guajalato	130
Huapito	Santa Ana	100
Los de Borla	Mexican	10
Los de Marav das	Hidalgo	200
Polation	"	150
Potosi	"	150
Purisma de los Com	"	5
Real del Monte	Hidalgo	900
Refugio y Va	"	8
Revolucion	Durango	50
Rosario y Anexas	"	50
San Francisco	Hidalgo	210
St. Fed. Chalcabuites	"	100
San Rafael y Anexas	"	925
do Free Stock	"	400
San Rafael del Oro	Hidalgo	20
Sto. Maria de la Paz	S. Luis Potosi	730
Suquia	Durango	30
Unionidad	Hidalgo	100
Sorpres	"	250
Unionidad	Guajalato	10
Tlaxingo	Puebla	27
Union	Hidalgo	260
Zaragoza	"	15
Zaragoza y gold	Vera Cruz	100
Zona Min. de Potosi	Guajalato	15

NOTE—The above Mexican stocks are figured on the basis of Mexican silver.



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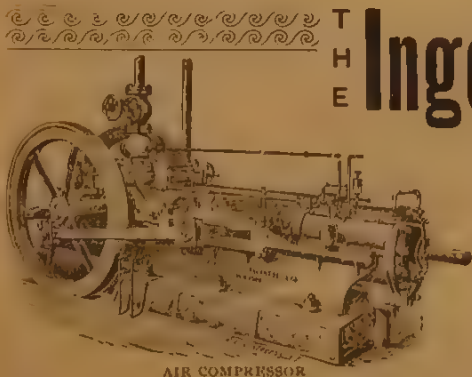
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## INCORPORATED MINES PAYING DIVIDENDS.

NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Mineral Produced
Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Sept 1897	\$ 110,000	G
Adams	Colorado	160,000	1,500,000	10	04	October 1895	893,500	S, L, C
Alaska, Treadwell	Alaska	200,000	5,000,000	25	35 1/2	October, 1897	9,250,000	G
Alaska Mexican	Alaska	200,000	1,000,000	5	10	Oct., 1897	270,000	G
Alce	Montana	400,000	10,000,000	25	08	Oct 1897	1,000,000	G, S
Anaconda	Montana	1,200,000	80,000,000	25	1 1/25	May 1897	3,700,000	C
Anchoria Leland	Colorado	600,000	600,000	1	01	Oct 1897	81,000	G
American Gold	Colorado	800,000	3,000,000	10	02	Aug 1897	270,000	G, S, L
Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1897	710,000	C
Bald Butte	Montana	250,000	250,000	1	03	Sept 1897	12,000	G, S
Bangkok-C-Bell	Colorado	600,000	600,000	1	01	July 1896	107,000	S, L, C
Big Six	Colorado	500,000	500,000	1	00 1/2	April 1897	1,000	G, S
Boston & Montana	Montana	160,000	8,750,000	25	3 00	Aug 1897	62,500,000	G, C, S
Bullion Beck and Champion	Utah	100,000	1,000,000	10	50	Mar 1897	2,000,000	G, S
Bunker Hill and S	Idaho	800,000	3,000,000	10	05	Oct 1897	324,000	S, L
Cariboo	British Col.	800,000	800,000	1	02	May 1897	156,965	G
C. O. D.	Colorado	600,000	600,000	1	01	March 1896	25,000	G
Calumet & Hecla	Michigan	10,000	2,600,000	25	10 00	Oct 1897	50,850,000	C
Centennial Eureka	Utah	30,000	1,600,000	50	1 00	Mar 1897	2,010,000	S, L
Central Lead	Missouri	4,000	400,000	100	1 00	Oct 1897	16,000	L
Charleston	South Car	10,000	1,000,000	100	1 00	Feb 1897	160,000	G
Champion	California	34,000	340,000	10	25	Aug 1897	278,200	G
Consolidated, California and Virginia	Nevada	210,000	21,600,000	100	25	March 1895	3,592,800	G, S
Copper Queen Consolidated	Arizona	200,000	2,000,000	10	25	June 1895	1,910,000	C
Crescent	Utah	24,000	800,000	25	00	July 1897	280,000	G
Daly	Utah	150,000	8,000,000	20	25	Mar 1897	2,925,000	S, L
Deadwood Terra	Dakota	200,000	5,000,000	25	40	June 1897	1,320,000	G
De Lamar	Idaho	400,000	2,000,000	5	25	Jan 1897	2,250,100	S, L
Della S	Colorado	1,000,000	1,000,000	1	10	Jan 1897	60,000	G
Doe Run	Missouri	5,000	500,000	100	50	October 1897	1,000	L
Dalton and Lark	Utah	2,500,000	2,500,000	1	00 1/2	August 1896	87,500	S, L
Elkton Consolidated	Colorado	1,250,000	1,250,000	1	03	Sept 1897	381,980	G
El Paso	Colorado	850,000	850,000	1	01	Aug 1897	5,393	G, S
Florence	Montana	500,000	2,500,000	5	01	May 1897	132,530	G
Galena	Utah	100,000	1,000,000	10	05	Jan. 1897	71,000	G, S, L
Garfield Grouse	Colorado	1,200,000	1,200,000	1	01	Feb. 1897	24,000	G
Geysers-Marion	Utah	800,000	1,500,000	5	03	Nov 1897	54,000	G
Golden Eagle	Colorado	1,000,000	1,000,000	1	01	Sept 1896	10,000	G
Golden Fleece	Colorado	600,000	600,000	1	01	Feb. 1897	569,179	G, S
Gold Coin	Colorado	200,000	1,000,000	5	05	Aug 1897	160,000	G
Gold and Globe	Colorado	750,000	750,000	1	3-10	July 1897	51,625	G
Hecla Consolidated	Montana	30,000	1,500,000	50	50	Feb 1897	2,175,000	S, G, L, C
Helena & Prisco	Idaho	500,000	2,500,000	5	04	August 1896	475,000	S, L
Highland	S. Dakota	100,000	10,000,000	100	20	Oct 1897	3,424,918	G
Holy Terror	S Dakota	300,000	300,000	1	03	Sept 1897	18,000	G
Homestake	Dakota	125,000	12,500,000	100	25	Oct. 1897	6,431,250	G
Hupe	Montana	100,000	1,000,000	10	10	Nov 1897	732,252	S
Horn Silver	Utah	400,000	10,000,000	25	12 1/2	January 1896	5,080,000	S, L
Idaho	Brit. Col.	500,000	500,000	1	05	Mar 1897	152,000	G
Iowa	Colorado	1,000,000	1,000,000	1	00 1/2	Oct 1897	65,000	G
Iron Mountain	Montana	500,000	5,000,000	10	01	Sept 1897	497,500	S
Isabella	Colorado	2,250,000	225,000	100	00 1/2	June 1897	270,000	G
Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160,000	C
Last Chance	Brit. Col.	500,000	500,000	1	04	Jan 1897	42,000	S, L
Le Roi	British Col	500,000	2,500,000	5	10	Oct 1897	625,000	G
Minnesota	Minnesota	165,000	16,500,000	100	1 50	July 1896	3,240,000	L
Montana Ore Purchasing	Montana	40,000	1,000,000	25	01	October 1897	640,000	G
Moose	Colorado	600,000	600,000	1	01	January 1896	186,000	G
Morning Star	California	2,400	240,000	100	8 00	Sept. 1897	558,800	G
Mt. Rosa	Colorado	1,000,000	1,000,000	1	00 1/2	Oct. 1896	30,000	G
Mercur	Utah	200,000	5,000,000	25	12 1/2	Oct 1897	825,000	G, S, O
Mammoth	Utah	400,000	10,000,000	25	05	Nov. 1896	1,150,000	G, S, O
Moon Anchor Gold	Colorado	900,000	900,000	1	02 1/2	Nov 1897	83,000	G
New Elkhorn	Colorado	300,000	1,500,000	5	24	Sept. 1896	72,000	G
New York & Hon. Rosario	Central A.	160,000	1,500,000	10	10	Oct. 1897	832,500	S, G
Napa	California	100,000	700,000	7	20	Oct 1897	870,000	Q
New Idria Quicksilver	California	100,000	500,000	5	10	Sept 1897	20,000	Q
Ontario	Utah	150,000	15,000,000	100	10	June 1897	15,445,000	S, L
Oncola	Michigan	50,000	1,250,000	25	1 00	June 1897	2,172,500	C
Parrot	Montana	230,000	2,300,000	10	06	June 1897	1,656,122	O
Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Sept 1897	20,750	G
Portland	Colorado	3,000,000	3,000,000	1	01	Oct 1897	1,163,000	G, S
Princess	Colorado	1,000,000	1,000,000	1	00 1/2	Feb 1897	45,000	G
Quincy	Idaho	100,000	2,500,000	25	4 00	August 1897	9,470,000	O
Rambler-Cariboo	Brit. Col	1,000,000	1,000,000	1	02	April 1897	40,000	G
Reco	Brit. Col	1,000,000	1,000,000	1	50	May 1897	187,500	S, L
Sacramento	Utah	1,000,000	5,000,000	5	00 1/2	March 1897	22,000	G
Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Mar 1896	3,275,000	S
South Swansea	Utah	150,000	150,000	1	05	Oct 1897	59,960	S, L
Standard	California	200,000	20,000,000	100	10	Sept 1897	3,757,988	G, S
St. Joseph	Missouri	250,000	2,500,000	10	15	Oct 1897	21,000	L
Silver King	Utah	150,000	8,000,000	20	25	October 1897	1,237,000	S, L, G
Slocan Star	Brit. Col.	2,000,000	1,000,000	0 50	05	Mar 1897	350,000	G
Smuggler Union	Colorado	50,000	5,000,000	10	1 00	Oct 1896	150,000	G, S
Swansea	Utah	100,000	500,000	5	05	Oct 1897	61,000	S, L
Tom Boy	Colorado	200,000	2,000,000	10	20	March 1896	410,000	G
Tamarack	Michigan	60,000	1,500,000	15	3 00	June 1897	4,900,000	C
Union	Colorado	1,250,000	1,250,000	1	01	June 1896	73,000	S
United Verde	Arizona	300,000	3,000,000	10	25	December 1893	562,000	C
Utah	Utah	100,000	1,000,000	20	02	Feb 1897	175,000	G, S
Utah Consolidated	Utah	80,000	150,000	5	02	Sept 1896	3,000	S, L
Victor	Colorado	200,000	1,000,000	5	10	March 1897	765,000	G
Western Mine Enterprise	Montana	500,000	500,000	1	10	Mar 1897	12,000	G
War Eagle	British Col.	500,000	500,000	1	06	October 1896	187,000	G

S, Silver.

G, Gold

L, Lead.

C, Copper.

Q, Quicksilver.

I, Iron.

B, Borax.





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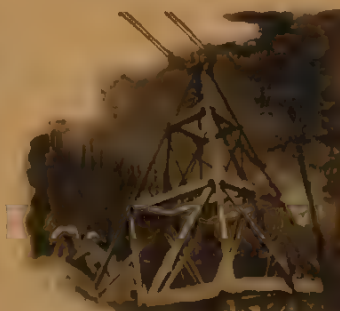
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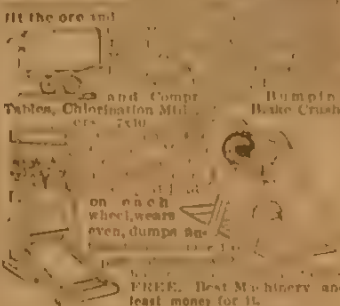
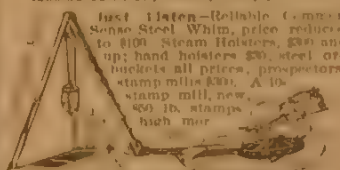
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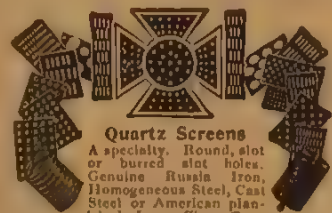
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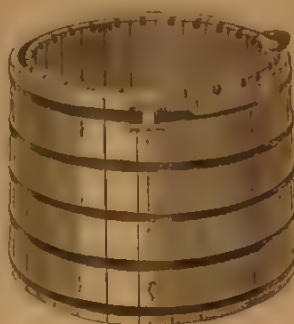
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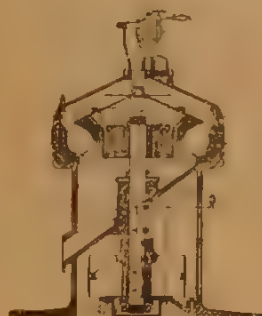
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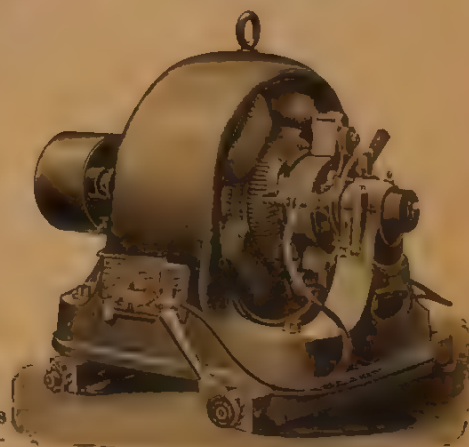
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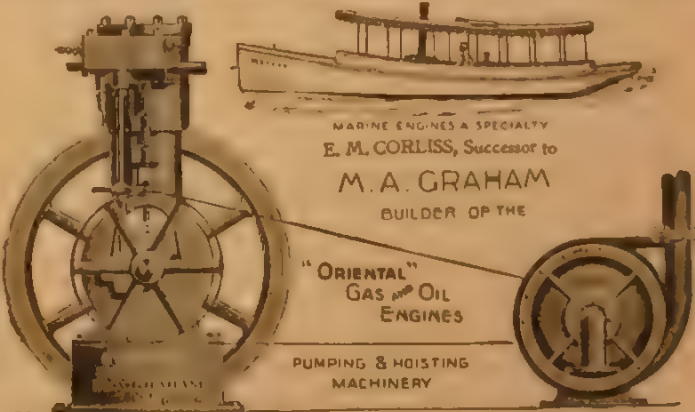
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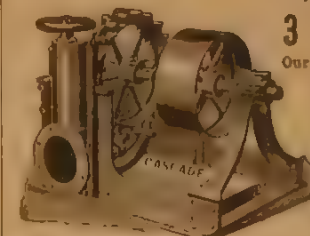
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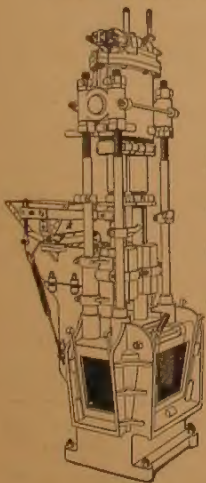
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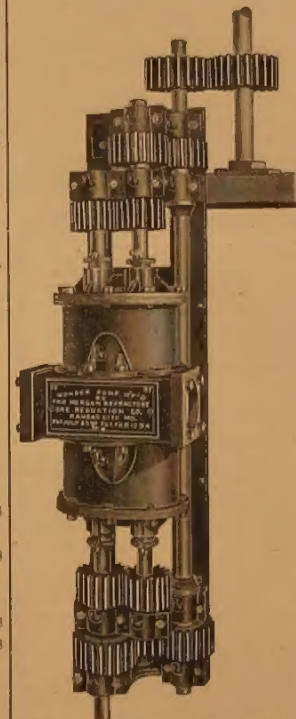
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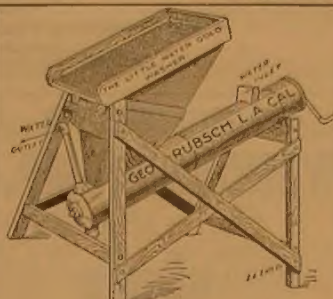
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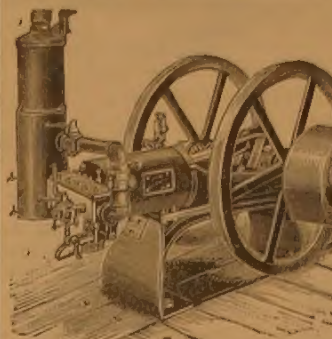
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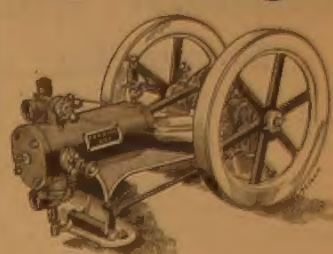
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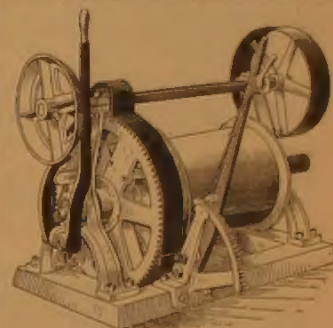
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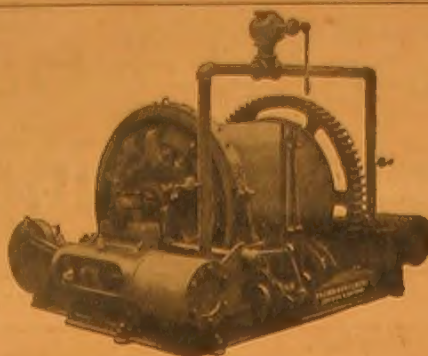
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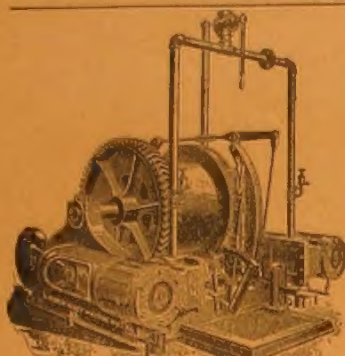


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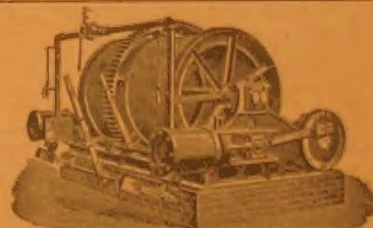
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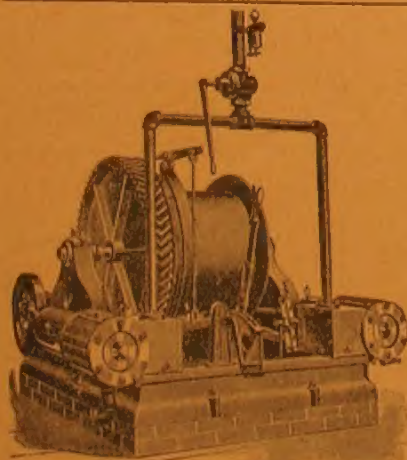
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